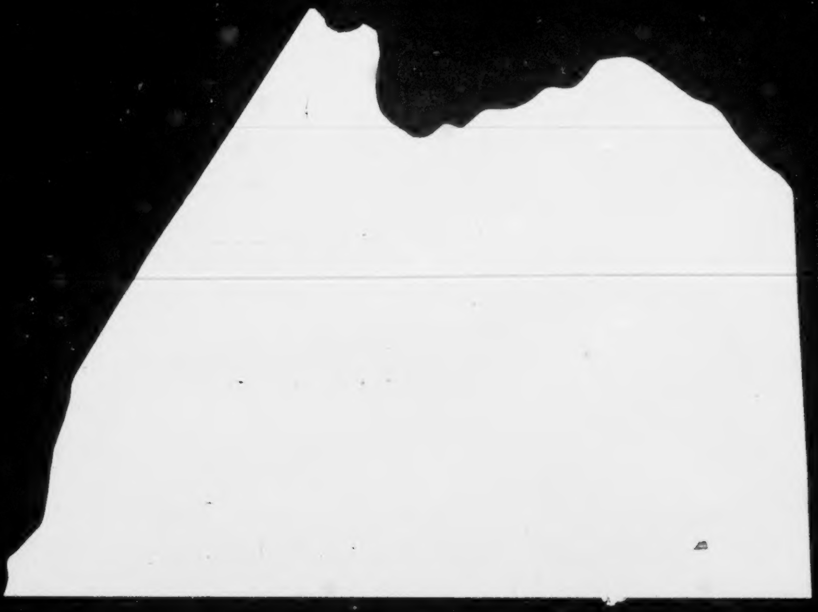
DOCUMENT RESUME

ED 053 245 VT 010 660

AUTHOR	Clark, David H.
TITLE	Maine's Occupational Needs to 1975.
INSTITUTION	Maine Univ., Orono.
PUB DATE	Aug 69
NOTE	93p.
AVAILABLE FROM	Manpower Research, 40 South Stevens, University of Maine, Orono, Maine 04473
EDRS PRICE	EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS	Bibliographies, *Employment, *Employment Projections, *Manpower Needs, *Occupational Surveys, *Occupations, Tables (Data)
IDENTIFIERS	*Maine

ABSTRACT

A survey of Maine industries provides information on occupational growth so that educators, guidance counselors, and directors of educational and training institutions can make assessments of future manpower needs. Projections are made for all segments of the economy which are covered by the Federal Insurance Contributions Act, or about 75 percent of total employment. Data for making the estimates were supplied by the National Planning Association. The study showed that no drastic change in occupational distribution was forecast for the period up to 1975. A comprehensive section on projected occupational needs provides: (1) a summary of projections for each occupational group, (2) the entry jobs for each industry occupational group, and (3) a summary of the training and education requirements for the entry jobs. Extensive charts and tables support and illustrate the narrative presentation. (BC)



MAINE'S OCCUPATIONAL NEEDS TO 1975

VT010660

MANPOWER RESEARCH PROJECT
UNIVERSITY OF MAINE, ORONO
August 1969

ED053245

Maine's Occupational Needs To 1975

by

David H. Clark

A Report to the MAINE MANPOWER ADVISORY COMMITTEE

This study was conducted with funds provided by the Maine Employment Security Commission and the New England Regional Commission.

Manpower Research Project
University of Maine, Orono
August 1969

VT010660

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY

Maine Manpower Advisory Committee

Dr. John Coupe, Chairman
Harold Baum
George Chenell
Benjamin Dorsky
Albert Gardner
Arnold McKenney
J. Weldon Russell
Edmund Socec
William Springer

Manpower Research Project Staff:

David H. Clark, Director
Margharetta E. Beitzell, Research Associate
Harland I. Hasey, Research Associate
Josephine T. Crouse, Research Associate
(through August, 1968)
Marlene S. Spellman, Secretary
Dorothy H. Curtis, Secretary

Supervisors for the summer field survey

Brian Mulherin
Thomas Skolfield
Richard Randall

TABLE OF CONTENTS

Title — Page

Chapter 1 SUMMARY AND INTRODUCTION 1
- Scope of the Study 1
- How Projections Were Made 3
- Example of the Projection Techniques 4
- Effect of Higher Projections of Total Employment 6
- Non-Trend Employment Growth 6
- Occupational Distribution and Change 1960-1968 6
- Occupational Distribution and Change 1968-1975 8

Chapter 2 INDUSTRY EMPLOYMENT AND OCCUPATIONAL TRENDS IN MAINE 11
- Construction (SIC 15, 16, 17) 11
- Food and Kindred (SIC 20) 12
- Textile Mill Products (SIC 22) 12
- Apparel and Related Products 13
- Lumber and Wood Products, Except Furniture (SIC 24) 13
- Furniture (SIC 25) 13
- Paper and Allied Products (SIC 26) 14
- Printing, Publishing, and Allied Industries (SIC 27) 14
- Rubber and Miscellaneous Products (SIC 30) 14
- Leather and Leather Products (SIC 31) 15
- Fabricated Metal Products (SIC 34) 15
- Machinery, Except Electrical (SIC 35) 15
- Electrical Machinery, Equipment, and Supplies (SIC 36) 16

Contents Continued

Title Page

Transportation Equipment (SIC 37) 16

Transportation and Public Utilities (SIC 40-49) 16

Trucking and Warehousing (SIC 42) 17

Communications (SIC 48) 17

Public Utilities (SIC 49) 17

Wholesale and Retail Trade (SIC 50 to 59) 17

Finance, Insurance and Real Estate (SIC 60-67) 18

Service and Miscellaneous Industries (SIC 70-89) . . . 18

Public Administration (SIC 91, 92, 93) 19

Chapter 3 OCCUPATIONAL NEEDS FOR THE STATE OF MAINE 21

Professional and Technical Workers 21

Officials and Managers 26

Sales Workers 29

Clerical and Kindred Workers 32

Craftsmen 34

Operatives 41

Laborers 45

Service Workers 47

APPENDICES

A Occupational Distribution for Major Industry Groups in Maine 1960, 1968, and Projected Needs to 1975 . . . 53

B Hiring Requirements for Particular Jobs 65

C Bibliography 81

LIST OF TABLES AND CHARTS

Table	Title	Page
I-1	**Scope of Study**—Total Employment in July 1968 and Groups Excluded from Occupational Needs Study, and Projections to 1975	2
I-2	Occupational Distribution for Electrical Machinery, Equipment and Supplies (SIC 36) 1960, 1968, and Projected Needs to 1975	5
I-3	Occupational Distribution for Electrical Machinery Industry 1960, 1968 and Alternative Projections for 1975	5

Chart

I-1	Percent of Professional and Technical Workers, 1960, 1968 and Projections to 1975	6
I-4	Occupational Distribution U. S. and Maine, 1960	7
I-5	Occupational Distribution in a Selected Part of the Maine Economy, 1960 and 1968 and Projections for 1975	7
I-6	Needs for Additional Workers in a Selected Part of the Maine Economy 1968-1975	8
III-1	New and Replacement Professional and Technical Workers Needed to 1975, by Industry	22
III-2	Total Needs to 1975 for Professional and Technical Workers, by Specific Occupation	23
III-3	Entry Jobs—Professional Workers and the Proportion of Professional Workers in Each Entry Job, by Industry	23
III-4	Entry Jobs—Technical Workers and the Proportion of Technical Workers in Each Entry Job, by Industry	24
III-5	Education and Training Requirements for Professional Entry Jobs in Manufacturing	24
III-6	Education and Training Requirements for Professional Entry Jobs in Non-Manufacturing	24
III-7	Education and Training Requirements for Technical Entry Jobs in Manufacturing	25
III-8	Education and Training Requirements for Technical Entry Jobs in Non-Manufacturing	25
III-9	New and Replacement Managerial Workers Needed to 1975, by Industry	26
III-10	Entry Jobs—Managers, Officials & Proprietors, and the Proportion of These Workers in Each Entry Job, by Industry	27
III-11	Education and Training Requirements for Official and Manager Entry Jobs in Manufacturing	28
III-12	Education and Training Requirements for Official and Manager Entry Jobs in Non-Manufacturing	28
III-13	New and Replacement Sales Workers Needed to 1975, by Industry.	29
III-14	Entry Jobs—Sales Workers and the Proportion of Sales Workers in Each Entry Job, by Industry	30
III-15	Education and Training Requirements for Sales Worker Entry Jobs in Manufacturing	31
III-16	Education and Training Requirements for Sales Worker Entry Jobs in Non-Manufacturing	31
III-17	New and Replacement Clerical Workers Needed to 1975, by Industry	32
III-18	Total Needs to 1975 for Clerical & Kindred Workers, by Specific Occupations	33
III-19	Entry Jobs—Clerical Workers and the Proportion of Clerical Workers in Each Entry Job, by Industry	33
III-20	Education and Training Requirements for Office and Clerical Entry Jobs in Manufacturing	34
III-21	Education and Training Requirements for Office and Clerical Entry Jobs in Non-Manufacturing	34
III-22	New and Replacement Craftsmen Workers Needed to 1975, by Industry	34
III-23	Total Needs to 1975 for Craftsmen, Foremen & Kindred Workers, by Specific Occupations	36, 37

Table	Title	Page
III-24	Entry Jobs—Craftsmen & Kindred Workers and Proportion of These Workers in Each Entry Job, by Industry	38, 39
III-25	Education and Training Requirements for Craftsmen Entry Jobs in Manufacturing	40
III-26	Education and Training Requirements for Craftsmen Entry Jobs in Non-Manufacturing	40
III-27	New and Replacement Operative Workers Needed to 1975, by Industry	41
III-28	Total Needs to 1975 for Operatives & Kindred Workers, by Specific Occupations	42
III-29	Entry Jobs—Operative Workers, and the Proportion of Operative Workers in Each Entry Job, by Industry	43
III-30	Education and Training Requirements for Operative Entry Jobs in Manufacturing	44
III-31	Education and Training Requirements for Operative Entry Jobs in Non-Manufacturing	44
III-32	New and Replacement Laborers Needed to 1975, by Industry	45
III-33	Entry Jobs—Laborers and the Proportion of Laborers in Each Entry Job, by Industry	45
III-34	Education and Training Requirements for Laborer Entry Jobs in Manufacturing	46
III-35	Education and Training Requirements for Laborer Entry Jobs in Non-Manufacturing	46
III-36	New and Replacement Service Workers Needed to 1975, by Industry	47
III-37	Total Needs to 1975 for Service Workers, by Specific Occupations	47
III-38	Entry Jobs—Service Workers and the Proportion of Service Workers in Each Entry Job, by Industry	48
III-39	Education and Training Requirements for Service Entry Jobs in Manufacturing	49
III-40	Education and Training Requirements for Service Entry Jobs in Non-Manufacturing	49

APPENDIX A

A-1	Occupational Distribution for Contract Construction (SIC 15, 16, 17) in Maine 1960, 1968, and Projected Needs for 1975	53
A-2	Occupational Distribution for Food Products (SIC 20) in Maine 1960, 1968, and Projected Needs for 1975	53
A-3	Occupational Distribution for Textile Mill Products (SIC 22) in Maine 1960, 1968, and Projected Needs for 1975	54
A-4	Occupational Distribution for Apparel and Related Products (SIC 23) in Maine 1960, 1968, and Projected Needs for 1975	54
A-5	Occupational Distribution for Lumber and Wood Products (SIC 24, 25) in Maine 1960, 1968, and Projected Needs for 1975	55
A-6	Occupational Distribution for Paper and Allied Products (SIC 26) in Maine 1960, 1968, and Projected Needs for 1975	55
A-7	Occupational Distribution for Printing and Publishing (SIC 27) in Maine 1960, 1968, and Projected Needs for 1975	56
A-8	Occupational Distribution for Chemicals and Allied Products (SIC 28) in Maine 1960, 1968, and Projected Needs for 1975	56
A-9	Occupational Distribution for Rubber and Miscellaneous Plastics (SIC 30) in Maine 1960, 1968, and Projected Needs for 1975	57
A-10	Occupational Distribution for Leather and Leather Products (SIC 31) in Maine 1960, 1968, and Projected Needs for 1975	57
A-11	Occupational Distribution for Other Durables (SIC 32, 33, 38, 39) in Maine 1960, 1968, and Projected Needs for 1975	58
A-12	Occupational Distribution for Fabricated Metal Products (SIC 34) in Maine 1960, 1968, and Projected Needs for 1975	58
A-13	Occupational Distribution for Machinery, Except Electrical (SIC 35) in Maine 1960, 1968, and Projected Needs for 1975	59

A-14 Occupational Distribution for Electrical Machinery Equipment and Supplies (SIC 36) in Maine 1960, 1968, and Projected Needs for 1975 59
A-15 Occupational Distribution for Transportation Equipment (SIC 37 in Maine 1960, 1968, and Projected Needs for 1975 60
A-16 Occupational Distribution for Trucking & Warehousing (SIC 42) in Maine 1960, 1968, and Projected Needs for 1975 60
A-17 Occupational Distribution for Communications (SIC 48) in Maine 1960, 1968, and Projected Needs for 1975 61
A-18 Occupational Distribution for Public Utilities (SIC 49) in Maine 1960, 1968, and Projected Needs for 1975 61
A-19 Occupational Distribution for Other Transportation (SIC 41, 44-47) in Maine 1960, 1968, and Projected Needs for 1975 62
A-20 Occupational Distribution for Wholesale Trade (SIC 50) in Maine 1960, 1968, and Projected Needs for 1975 62
A-21 Occupational Distribution for Retail Trade (SIC 52-59) in Maine 1960, 1968, and Projected Needs for 1975 63
A-22 Occupational Distribution for Finance, Insurance and Real Estate (SIC 60-67) in Maine 1960, 1968, and Projected Needs for 1975 63
A-23 Occupational Distribution for Miscellaneous Service (SIC 70-89) in Maine 1960, 1968, and Projected Needs for 1975 64
A-24 Occupational Distribution for Public Administration (SIC 91, 92, 93) in Maine 1960, 1968, and Projected Needs for 1975 64

APPENDIX B

B-1 Hiring Requirements for Particular Entry Jobs for Professional Workers 65
B-2 Hiring Requirements for Particular Entry Jobs for Technical Workers 66
B-3 Hiring Requirements for Particular Entry Jobs for Managers and Officials 67
B-4 Hiring Requirements for Particular Entry Jobs for Sales Workers 67
B-5 Hiring Requirements for Particular Entry Jobs for Office and Clerical Workers 68-70
B-6 Hiring Requirements for Particular Entry Jobs for Craftsmen 71-76
B-7 Hiring Requirements for Particular Entry Jobs for Operatives 77
B-8 Hiring Requirements for Particular Entry Jobs for Laborers 77
B-9 Hiring Requirements for Particular Entry Jobs for Service Workers 78-79

Introduction and Summary

Chapter 1

The objective of this report is to provide estimates of occupational growth so that the educators, guidance counselors, and directors of educational and training institutions can take the probable needs of the State into account in planning their programs and advising students. These estimates are based on a survey of Maine industries comprising a large portion of the economy of the State. The survey data provided a basis for (1) projections of 1975 occupational requirements of these industries; (2) identification of entry jobs—jobs that are normally filled from outside the company, including (3) the current education and training requirements for these entry jobs.

The projections should be used with caution and tempered with judgment. There are many sources of possible error: occupational classification systems leave much to be desired. There is little historical data on which to establish State trends especially in regard to occupations. The techniques used to project occupational requirements use national trends, which may not be appropriate for the State. Finally, predicting the future, especially for particular sectors of the Maine economy, is a risky task at best. Consequently, the assumptions underlying the projected employment trends are made as explicit as possible, so that the user can make adjustments according to his best judgment or as new information becomes available.

The sweeping overview of the Maine economy reported here cannot replace careful analysis of changes which may occur in some segments of the economy. For example, at the time of writing there is a very good chance that Bath Iron Works will expand significantly. This report cannot predict changes due to expansion at Bath Iron Works, let alone detail the implications of these changes for occupational requirements. In fact, the assumption of significant expansion of any industry would affect the entire set of projections for the State. It is the responsibility of people concerned with planning for training and education in the State to be aware of any significant changes in industry and to work with the industry in meeting its education and training needs.

Scope of the study

Projections are provided for a part of the Maine economy, about 75% of total employment. Excluded are employees in agriculture, forestry, fisheries, non-profit organizations, railroads, education and health services, the self-employed and private household workers. Table I-1 shows total State employment for July, 1968 and the annual employment for the sectors included in this study. Most groups excluded were those not covered by the Federal Insurance Contributions Act since no list of firms was readily available. Other groups, especially

Table I-1

Scope of Study — Total Employment in July 1968 and Groups Excluded From Occupational Needs Study, and Projections to 1975

SIC		Total Work Force July 1968, MESC	Estimated Annual Work Force in Scope of Study, 1968	Projected Work Force 1975
	A. Estimated Total Labor Force	396,186	265,046	284,031
	B. Unemployed	18,900		
	C. Employed	377,286	265,046	284,031
	1. Nonfarm	317,286	265,046	284,031
	A. Total Manufacturing	118,052	118,170	126,031
	Durable Goods	33,342	34,210	38,920
19	Ordnance	N.A.	*	–
24 & 25	Lumber & Wood, and Furniture	16,438	16,438	15,300
34	Fabricated metals	2,077	2,188	2,200
35	Machinery, exc. elec.	2,621	2,621	3,000
36	Electrical Machinery, Equipment, Supplies	3,947	4,545	6,700
37	Transportation Equip.	5,162	5,162	8,230
32, 33, 38, 39	Other Durables	3,097	3,256	3,490
	Nondurable Goods	84,710	83,690	87,111
20	Food & Kindred	14,698	12,700	14,100
22	Textile	12,156	12,156	9,660
23	Apparel	3,336	3,929	7,080
27	Printing & Publishing	2,587	2,587	2,201
28	Chemicals	989	1,374	1,170
30	Rubber & Misc. Plastic	2,550	2,550	2,880
26	Paper	17,660	17,660	19,100
31	Leather	30,734	30,734	30,920
	B. Total Nonmanufacturing	199,234	146,876	158,000
15-17	Construction	18,391	15,500	18,000
	Mining	–	*	–
	Transportation & Public Utilities	16,688	13,902	13,600
40	Railroad	3,655	*	–
42	Trucking & Warehousing	4,418	4,418	4,800
48	Communications	3,345	4,214	4,000
49	Utilities & Sanitary	3,150	3,150	2,900
41, 44-47	Other Transportation	2,120	2,120	1,900
	Wholesale & Retail Trade	63,930	61,630	65,000
50	Wholesale Trade	15,429	15,429	17,700
52-59	Retail Trade	48,501	46,201	47,300
53	General Merchandise	7,752	6,671	8,238
54	Food & Dairy	9,284	9,284	7,718
58	Eating & Drinking	8,761	7,542	10,795
52, 55-57, 59	Other Retail	22,704	22,704	20,549
60-69	Finance, Insurance & Real Estate	11,548	11,548	12,800
	Service & Other Nonmanufacturing	41,100	16,602	18,200
70	Hotels & Lodging	6,776	5,000	5,000
73	Business Services	2,163	2,163	2,800
75, 76	Repair Services	1,844	1,844	1,900
78 & 79	Entertainment & Recreation	2,023	2,023	2,100
82	Educational Services	4,129	*	–
86	Non-profit Organizations	7,010	*	–
72	Other Personal Services	3,601	3,601	3,600
81, 89	Other Professional	1,971	1,971	2,800
80	Health Services	11,583	*	–
	Public Administration	59,160	27,694	30,400
91	Federal	17,970	6,706**	10,200
92	State	15,003	10,213**	7,344
93	Local	26,187	10,775**	13,056
	2. Non-farm All Other	41,000	*	–
	3. Agriculture	19,000	*	–

* Industries excluded from the Scope of the Study.

Non-farm All Other includes: self-employed, proprietors, unpaid private household family and domestic workers.

**Industries within the Scope of the Study but excluding certain component parts:

91 Excludes Hospitals, Kittery Naval Yard, and several post office units and military units unable to be interviewed for varying reasons.

92-3 Excludes education, and health and hospitals on State and local levels.

education and health, represent unique and distinct problems; consequently it was inappropriate to include them in such a broad overall study.

How projections were made

The most immediate objective of the study has been to identify those occupational groups in particular industries which are going to need the largest number of new entrants during the period 1968-1975. Why would additional persons be required in a particular industry-occupational group? There are four basic reasons; all have to be taken into account in projecting occupational needs of the State. New entrants would be needed: (1) if the total employment in the industry increases; (2) because of technological change—as new techniques are developed or new methods of production and distribution are introduced, requirements change for different kinds of workers; (3) because of changes in the makeup of industry—most industry projections are in broad two digit SIC categories which can hide significant changes in that industry (for example, the occupational requirements of one segment of the food industry can be significantly different from those of other segments); and (4) because men or women die, retire, or are promoted outside the occupational group and new workers are required for replacement.

The sources and techniques used to meet these data requirements are as follows: *Employment projections by industry, 1975.* National Planning Association projections were the series used to project the total employment in each industry for the State of Maine in 1975.[1] NPA employment figures are in concept equivalent to the national civilian employment data reported in *Employment and Earnings* and the *Monthly Report of the Labor Force*, that is, they represent a count of persons employed in the State (including wage and salary workers, the self-employed, and unpaid family workers but excluding dual job holders).

In general, NPA projections take into account projected national growth by industry and projected State growth as a percent of national growth. The projections, in turn, are reconciled with independent projections of the labor force and population using an iterative process. NPA provides the only consistent series of projections for State employment by industry. It would certainly be preferable to use employment projections made by local analysts familiar with the State economy rather than projections from a mathematical model which has been applied to all states but these are not available.

Total employment projections are critical: an alternative forecast can drastically change projections of particular occupational needs. An example of the effect of a larger employment projection is given below. When a completely consistent locally produced projection of employment by industry is completed it should be applied to the estimated State occupational matrix.

The NPA projections have been adjusted to fit within the scope of the study. Some of the projections have been changed when they have seemed out of line with recent employment experience in the State. Table I-1 contains the projections by industry used in this study.[2]

---

[1] National Planning Association. State Population, Net Migration, Labor Force and Industry Employment Trends to 1975. Regional Economic Projection Series, Report No. 65-I. Washington, D.C. March, 1965.

[2] Following is a brief explanation of the adjustments made: (more explanation is given in Chapter 2 describing employment and occupational trends in each industry.)

SIC		
01-09	Agriculture, Forestry & Fisheries	Not in scope of study
10-14	Mining	Not in scope of study
15-17	Construction	Reduced by estimated number of self-employed
27	Printing and Publishing	Reduced by estimated number of self-employed
33	Primary metals	Based on more recent data
34	Fabricated metals	To remain at present levels
35	Non-electrical machinery	To rise slightly from present levels
36	Electrical machinery	NPA probably too low; estimate is a straight line projection
40-49	Transportation and Public Utility	Excludes railroads and the self-employed
50-59	Wholesale and Retail Trade	NPA appears too low; estimate based straight line projection and excludes self-employed
60-67	Finance, Insurance and Real Estate	Excludes self-employed
70-89	Services	Excludes education, health, non-profit organizations and the self-employed
91-93	Government	Excludes Kittery Naval Shipyard, health, hospitals and education

Changing occupational structure. The Bureau of Labor Statistics, U.S. Department of Labor, has prepared projections of the occupational structure within each industry for use as a guide in developing State manpower projections. The BLS projections are the needed proportions for every occupation in each industry, to be used with projections of total employment (such as those of NPA). The BLS projections together with suggested techniques, for their use are contained in their publication *Tomorrow's Manpower Needs.* These projections and forecasting techniques form the basis of the present study.[3]

BLS has compiled an actual industry-occupational matrix for 1960 containing the occupational distribution for each industry based upon the 1960 Census and a probable matrix for 1975 based upon their knowledge of the economic and technological factors (such as automation) which affect the occupational structure in each industry. The assumption is that state and local manpower estimates can be more adequate if the analyses are made within the context of nationwide economic and technological developments.

In general the technique suggested by BLS is to apply the national trends for each occupation in each industry to the statewide figures for 1960. The assumption is that each industry-occupation group will grow at the same rate as is found nationally, using 1960 as a base line.

To augment the BLS materials the Manpower Project conducted a survey in the summer of 1968 among all firms covered by the scope of the study.[4] Each firm was asked for: (a) its present occupational distribution (i.e., how many workers did the firm have in each of the nine broad occupational groups?); (b) the title of each entry job, and the number of persons employed under each entry job title; and (c) their educational and training requirements for these entry jobs.

Replacement needs. Estimates of need to replace persons lost because of death, retirement and promotion have been made using figures as provided by BLS in *Tomorrow's Manpower Needs.* These replacement estimates are separately reported so that the reader can make adjustments if he feels these should be changed. Interviewers also asked employers to report how many replacements were needed in the past year because of death or retirement. The numbers reported are much lower than the figures suggested by BLS; the reason for the discrepancy is unknown.

Example of the projection techniques

This section is a detailed explanation of the techniques and sources to develop an occupational projection using the electrical machinery industry (SIC 36) as an example. The section also includes the effects of a different projection for total employment in the industry and the effects of different assumptions about the occupational trends within the industry.

Table I-2 contains the various figures used in developing the projections for this industry. Columns 1 and 2 contain the occupational distribution for 1960 (source: U.S. Census). Columns 3 and 4 are the actual distribution in 1968 (source: Manpower Project survey). Although total employment increased over 80% during this period, the number of professional and technical workers and craftsmen actually declined.

Nationally, the occupational trends in the electrical machinery industry show rising proportions of operatives and service workers, and declining proportions of the other groups. The nationwide trends have been applied to the 1968 figure to arrive at the 1975 proportion contained in column 6. The proportions in column 6 have in turn been applied to the figure at the top of column 5, the projected total employment for this industry as developed by NPA, to arrive at the rest of the figures in column 5, which is the projected number of persons needed in each occupational group in 1975. Column 7 contains differences between the 1975 and 1968 figures, that is, the estimated growth (or decline if a negative result) in each particular occupational group. Column 8 contains the estimated number of persons needed to replace persons who have died, retired, or been promoted into a different occupational group.[5] Column 9 is the sum of columns 7 and 8, that is the total needed to fill any new jobs and any jobs opened up because of death, retirement or promotion. The column 9 figures are the projected needs referred to in this report.

Effects of differences in the occupational trends. The projections arrived at depend, of course, upon assumptions about the trend of occupational change and about the trends of total industry employment. A key assumption for the electrical machinery industry—as for many others—is that state occupational trends of the past eight years will be changed and that industry in Maine will follow national trends. The figures in Table I-3 illustrate this point. The expected figures for 1968 were arrived at by applying national trends to the actual State distribution for 1960. In virtually every occupational group, however, trends in the State of Maine were the opposite of national trends. To put it in plain terms, the proportion of good jobs dropped considerably while the proportion of not-so-good jobs increased very rapidly.

---

[3] U.S. Department of Labor, Bureau of Labor Statistics. *Tomorrow's Manpower Needs: National Manpower Projections and a Guide To Their Use as a Tool in Developing State and Area Manpower Projections,* draft copy. Washington, D.C., 1967.

Occupational projections are also found in:

U.S. Department of Labor, Bureau of Labor Statistics. *Occupational Employment Patterns for 1960 and 1975.* Bulletin No. 1599. Washington, D.C., December 1968.

[4] All firms with December 1967 employment of ten or more and 50% of employers with 4-9 workers were contacted by interviewers.

[5] This figure does not represent total turnover in the normal sense of the word. Turnover figures would be much higher; column 8 is net of turnover.

TABLE I-2

Occupational Distribution for Electrical Machinery Equipment and Supplies (SIC 36)
1960, 1968, and Projected Needs for 1975*

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975	Totals Needs to 1975, Employmen at 19,000
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)	(10)
Total	2491	100.0	4545	100.0	6700	100.0	2150	667	2817	15122
Professional & Technical	303	12.2	210	4.6	362	5.4	152	37	189	853
Officials & Managers	80	3.2	221	4.9	295	4.4	74	39	113	654
Sales	82	3.3	16	0.4	27	0.4	11	3	14	63
Office & Clerical	297	11.9	181	4.0	181	3.8	74	43	117	584
Craftsmen	530	21.3	262	5.8	262	6.1	147	37	184	934
Operatives	1122	45.0	3311	72.9	4918	73.4	1607	464	2071	11099
Laborers	52	2.1	289	6.4	355	5.3	66	30	96	748
Service Workers	25	1.0	55	1.2	74	1.1	19	14	33	168

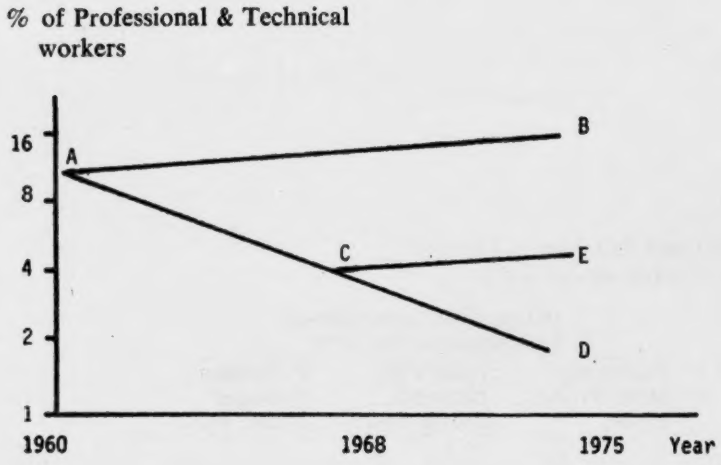
*Source of data: See text

TABLE I-3

Occupational Distribution for Electrical Machinery Industry
1960, 1968 and Alternative Projections for 1975

	1960	1968		Alternative Occupational Distributions for 1975		
	Actual	Expected	Actual	Following State Trend 60-68	Following National Trend 68-75	Following National Trend 60-75
Professional & Technical	12.2%	15.6%	4.6%	—%	5.4%	16.2%
Officials & Managers	3.2	2.6	4.9	5.4	4.4	2.4
Sales	3.3	2.9	.4	—	.4	2.8
Office & Clerical	11.9	10.3	4.0	—	3.8	10.3
Craftsmen	21.3	22.2	5.8	—	6.1	22.7
Operatives	45.0	44.3	72.8	84.4	73.0	43.3
Laborers	2.1	1.5	6.4	8.9	5.8	1.6
Service Workers	1.0	0.8	1.2	1.2	1.0	.6

Given the contradiction between State and national trends, what will the future be like? A researcher is faced with a real dilemma. Chart I-1 illustrates the situation for one particular occupational group, professional and technical workers in this industry. The BLS technique is predicated on the idea the State trend will parallel national trends—hence the proportion of professional and technical workers will rise from A to B. B is the figure in the last column of Table I-3. However, the Manpower survey showed the actual proportion had declined to point C. Will the trend continue to D? Or will the trend be reversed to parallel national trends and arrive at point E in 1975? The assumption of this report is that the latter will occur. To be specific, it is assumed that any significant changes in the make-up of Maine industry that did take place have ceased and that industry in the State will be forced to follow the national trend of requiring relatively fewer blue collar workers and relatively more white collar workers. If this assumption proves wrong, the projections of occupational requirements will be in error. If the proportion of professional and technical workers, projected to rise, in fact does fall (continuing the trend of the past eight years) most of the projected need for additional professional and technical workers in this industry would be eliminated. The rise in total employment and the need for replacements would do little more than balance the reduced proportion needed.



Effect of higher projections of total employment. One of the key assumptions is the figure chosen as the probable level of industry employment in 1975. Different total employment figures lead to wholly different projections of occupational requirements. As an example one analyst at the State's Department of Economic Development has suggested that employment in the electrical machinery industry will be at a level much higher than the NPA projections. If past growth is continued, he says, employment should be 19,000 in 1975. This figure has been used to calculate the total needs shown in column 10 of Table I-2 (assuming the occupational distribution in column 6 and the replacement needs in column 8). Quite obviously the effects of the larger total employment are quite drastic in terms of total needs, and quite different in terms of the implications one might have for education and training policy.

Non-trend employment growth

The predictions of future needs made in this report are based on past trends in the State's present industries. It is outside the scope of the study to predict or forecast the effects of non-trend employment growth, such as very rapid expansion of an existing industry or the introduction of a new industry. The possibility of rapid expansion at the Bath Iron Works mentioned in the introduction is an example of the unusually rapid expansion of an existing industry or firm; a possible new industry or new situation is the proposed Machiasport oil refinery and its satellite operations.

Any non-trend employment growth (such as the examples above) would have important implications for manpower planning. The BLS publications cited above provide a source for projecting new manpower needs should changes in the industrial picture occur, since they contain detailed occupational distributions for every industry, often to the three digit SIC level. Using these tables it is a relatively simple matter to break down specific occupations into the total employment that might be expected. Although single firms may differ considerably from the overall national figures, such an occupational distribution would provide a starting point for manpower planning.

Occupational distribution and change 1960-1968

The occupational distribution of Maine and the nation for 1960 is shown in Table I-4. Generally speaking Maine had a lower proportion of white collar jobs (professional and technical, clerical and managerial) and a much larger proportion of blue collar jobs, particularly semi-skilled (operatives) and unskilled (laborers). The occupational distribution accounts in part for the lower incomes found in the State—fewer people are in better paying white collar jobs.

In 1960, the proportion of professional and technical workers in Maine was 83% of the national average. The lower proportion of professional and technical workers can be explained in part by the type of industry found in Maine. Also there seem to be differences in the staffing patterns of firms located in Maine; they employ a much lower proportion of professional and technical workers than found nationally in the same industry. The underrepresentation of professional and technical workers occurs in the private sector, the sector of the economy covered by this study. In the industries surveyed, Maine's proportion of professional and technical workers was 60% of the national figure while the State's proportion of operatives was 140% and laborers was 133% of the comparable figure for the nation. In contrast, the number of professional and technical workers in industries excluded from the study—mostly in education and health—made up about the same proportion of Maine employment (6.3%) as they did nationally (6.1%) in 1960. Virtually every manufacturing industry had a lower proportion of professional and technical workers than found in the same industry nationally. This was not always true for non-manufacturing. Some of the transportation industries, public utilities, and most of the service industries had approximately the same proportion of professional and technical workers as is found nationally.

Since 1960, the proportion of professional and technical, clerical, and service workers has risen in the nation while the proportion of managers, sales workers, and laborers has fallen. (The proportion of operatives and craftsmen has stayed about the same.) Obviously, these trends have important implications for training and education programs. Table I-5 shows the occupational distribution for the State in the industries covered

TABLE I-4

Occupational Distribution U.S. and Maine, 1960

	United States		Maine	
White Collar Workers	26,587,834	41.2%	116,949	35.4%
Professional & Technical	7,232,410	11.2	30,697	9.3
Managers	5,409,543	8.4	28,130	8.5
Clerical & Kindred	9,306,896	14.4	36,558	11.1
Sales	4,638,985	7.2	21,564	6.5
Blue Collar Workers	23,746,424	36.7	151,063	45.7
Craftsmen	8,741,292	13.5	47,502	14.4
Operatives	11,897,601	18.4	80,746	24.4
Non-farm Laborers	3,107,531	4.8	22,815	6.9
Service Workers	7,170,795	11.1	33,395	10.1
Private Household Workers	1,725,826	2.7	8,500	2.6
Other Service Workers	5,444,962	8.4	24,895	7.5
Farm Workers	3,950,491	6.1	14,751	4.4
Occupations not reported	3,183,719	4.9	14,426	4.4
Total	64,639,256	100.0	330,584	100.0

TABLE I-5

Occupational Distribution in a Selected Part of the Maine Economy, 1960 & 1968

and Projections for 1975*

	1960	%	1968	%	1975 Projected Employment	%
White Collar Workers	84,396	33.6	93,002	35.5	101,121	35.6
Professional & Technical	10,550	4.2	12,706	4.8	15,844	5.6
Managers	17,331	6.9	25,698	9.8	27,260	9.6
Clerical & Kindred	33,909	13.5	35,582	13.6	19,106	6.7
Sales	22,606	9.0	19,016	7.3	38,911	13.7
Blue Collar Workers	149,954	59.6	148,825	56.8	158,700	55.9
Craftsmen	47,724	19.0	37,141	14.2	42,280	14.9
Operatives	82,387	32.8	82,415	31.4	87,336	30.8
Non-farm Laborers	19,843	7.9	29,269	11.2	29,084	10.2
Service	17,080	6.8	20,168	7.7	24,210	8.5
Total	251,430	100.0	261,995	100.0	284,031	100.0

*Excluding agriculture, forestry, fisheries, mining, railroads, the self-employed, health, education, and non-profit organizations.

by this study. State trends are very unlike national trends: among the professional and clerical groups the growth in Maine has been much slower than found nationally and among craftsmen and non-farm laborers the trend in Maine has been exactly opposite of national trends. Therefore, in the large sector of the Maine economy covered by this study, the gap between Maine and the rest of the country in the proportions of white collar and skilled worker jobs has widened in spite of the economic growth that has taken place. The widening gap can be attributed to specific parts of the economy. In general, the occupational distribution in most manufacturing industries has not followed the comparable trend in the nation for that industry; exceptions are the fabricated metal, machinery (except electrical), and transportation equipment industries. The non-manufacturing industries do show occupational trends similar to these of the nation (the one exception here is that finance, insurance and real estate shows a much larger increase in clerical workers in Maine than is found nationally). These atypical trends make future projections difficult and the reader should be especially leery of projections for those industries that have not followed national trends in the past.

Occupational Distributions and Change 1968-1975

The third column in Table 1-5 contains the projected occupational distribution for 1975 using the data, assumptions, and methods outlined in this report. No drastic change in the State's occupational distribution is projected; trends in the State are expected to become more similar to national trends.

If training activities are to be directed to the needs of the State, one must take into account (1) the probable needs for particular jobs, (2) whether jobs are filled from within or from outside the company, and (3) what firms want in terms of training and education requirements.

The total projected needs in each occupation are shown in Table I-6. The fastest rate of growth is expected among professional workers. However, because of differences in the overall number of workers in each occupational group the greatest need in numbers will be for operatives, then craftsmen, clerical, service, and officials and managers. In fact, only service workers and laborers will be needed in smaller numbers than professional and technical workers.

TABLE I-6

Needs for Additional Workers in a Selected Part of the Maine Economy 1968 - 1975

	Change in No. of Workers 1968-1975	Replacements	Total Needs to 1975
Professional & Technical	2813	2288	5101
Managers	1436	4522	5958
Sales	649	4010	4659
Office & Clerical	3253	8240	11493
Crafts	5419	5163	10582
Operatives	6491	10740	17231
Labor	–1666	3453	1787
Service	1039	5511	6550

The prospective needs in each occupational group may not be a true indication of the number of people who will be hired from outside the company. Many openings will be filled from inside the company, perhaps from another occupational group. This between occupation shifting varies between industries, companies, and jobs. Generally speaking, the occupational groups with a high proportion of entry jobs are professional and technical, saleworkers, clerical, operatives, laborers and service workers. Most official and manager positions are filled from inside the company. The general picture for craftsmen is mixed; in some manufacturing industries most craftsmen jobs are filled from within the company, while in the other manufacturing and most non-manufacturing craftsmen jobs are entry jobs.

Most firms in the State who hire professional workers require professional training (e.g., a college education) and about half of the firms who hire clerical workers require formal training of some kind. In the other occupational groups few firms have formal occupational training as a minimum hiring requirement. There are almost no educational and training requirements for operatives, laborers, and service workers. This lack of requirements for operatives and similar jobs is not surprising. But even in the skilled craftsmen jobs most firms do not require formal occupational training; the usual requirement is experience in the craft.

The need for training is probably greater than this study indicates. The hiring requirements reported are minimum and the vocational school graduate should be able to compete with the candidate with experience but no formal training. Other studies show that the Maine worker with vocational training earns more on the average than the man who does not have any training.[6] In some cases, though, a selling job may be necessary to develop an effective demand for graduates of a particular program.

---

[6] Taking into account age and education; from unpublished studies of the University of Maine's Manpower Research Project.

After taking into account needs and current practices in regard to entry jobs and training requirements these occupations or jobs appear to be prime targets for training programs:[7]

Professional:	Accountants Engineers Chemists Attorneys Social workers
Technical:	Draftsmen Engineering aides Computer programmers Electronic technicians Laboratory technicians
Officials and Managers:	Officials, buyers & purchasers, Managers, etc. especially in non-manufacturing
Sales Workers:	Sales workers in wholesale and retail trade and finance
Clerical:	Secretaries and Stenographers General office workers Bookkeepers
Craftsmen:	Mechanics and repairmen Foremen Electricians
Operatives:	Apprentices in construction

The statistics and trends contained in this report are only a part of the information needed to develop an overall manpower plan for the State. First of all this report deals only with the demand side—the needs for workers. A complete plan must take into account the supply side, the characteristics of the current labor force as well as the enrollment and curriculum of the schools and training programs. Second, there must be provision for a review and updating of the data and the projections in their report. The accuracy of key assumptions should be checked and adjustments should be made for non-trend development and unforeseen changes in the structure of industry. Fortunately the 1970 Census will provide much of the data needed for such a review. Third, an accurate analysis of the economic base of the State is needed which should provide the basis for better projections of the State's employment growth. Particularly needed is more information about most of the non-manufacturing sectors of the economy, information comparable to that found in the *Census of Maine Manufacturing*. Fourth, accurate projections of the manpower demand and supply are needed for the sectors of the economy not included in this study, notably health and education.

---

[7] Some of the occupations have high rates of growth but the total number of new jobs may be relatively small, see tables in chapter 3 for estimates of the numbers needed.

Industry Employment and Occupational Trends in Maine

Chapter 2

This chapter contains a short description of employment and occupational trends in each of Maine's major industries along with the comparable national trends.[1]

Construction (SIC 15, 16, 17)

There were 18,000 wage and salary workers employed in contract construction at the time of the survey in July, 1968. There is considerable seasonal variation in employment in this industry. During 1967, covered employment in contract construction varied from 9600 workers in March to over 16,000 workers in July and August, with an annual average employment of 13,084. Such large seasonal changes make it difficult to evaluate and project occupational requirements in contract construction. The July employment figure has been converted to an estimated annual average employment of 15,500 for 1968[2] which is used for projection purposes.

Nationally, employment in contract construction has increased steadily since 1960-61. Maine's employment has increased by 14% between 1960 and 1968, somewhat less than the national growth. Manpower requirements nationally are expected to rise by nearly one-third between 1965 and 1975. Faster increases are expected among heavy construction contractors, and special trades contractors. More moderate increases are expected among building contractors; Maine's needs will, of course, be affected by the number of housing starts in the State. The projection arrived at for contract construction in the State of Maine takes into account the slower growth experienced in the past: it is predicted that the industry will have 18,000 workers by 1975, an increase of 17% over 1965.

A variety of new technological developments are being introduced which are expected to change the occupational distribution. One effect will be reduced proportions of craftsmen and laborers. Even more important, these developments are expected to modify the rates and direction of change in the relative position of individual occupations. For example, the proportion of carpenters is expected to decline significantly due to the growing use of prefabricated components. The ratio of mechanics, on the other hand, is expected to increase in response to the growing use of scrapers, concrete paving machines, etc. Increases in requirements for engineers is expected to increase the proportion of professional and technical workers in the industry. With these changes in mind, projections for Maine include a very slight increase in the proportion of professional and technical workers, a decline in the proportion of craftsmen and laborers and an increase in the proportion of operatives.

---

[1] The source for the national employment and occupational trends is the BLS publication *Tomorrow's Manpower Needs.* Maine employment figures and trends are from figures published by the Maine Employment Security Commission and from U.S. Bureau of the Census, *County Business Patterns, Maine,* U.S. Government Printing Office, Washington, D.C. Additional information about Maine manufacturing is from Maine Department of Labor and Industry, *Census of Maine Manufactures,* D.L.I. Bulletins, Augusta, Maine.

[2] We have assumed that the seasonal employment of 2,900 workers were all operatives and laborers.

Food and Kindred Products (SIC 20)

There were about 12,700 workers in the food industry in 1968,[3] a rise of about 1,000 workers since 1960. Three of the nine industry groups within this major industry accounted for 4,800 or nearly 37% of total employment in 1968—meat products, which includes poultry dressing and packing, canned or preserved fruits, and sugar. The remaining workers were in establishments producing dairy products, grain mill products, bakery goods, beverages and other miscellaneous products.

Most industry groups showed little change in total employment since 1960. The exceptions were poultry, which rose by over 200 workers in this 8 year period, frozen foods, which doubled in size and a new sugar industry. Canned foods and the fish industry declined. There was a drop in the number of firms from 469 to 383.

Nationally, production workers account for about 67% of total employment within this major industry group. The proportion of production workers in the individual industry groups comprising this industry group differ widely, ranging from 46% in the dairy products industry group to over 85% in the canned and preserved foods industry. Maine's proportion of production workers is somewhat higher than the national average: 76% of the workers in 1960 were production workers. This proportion had risen to 80% by 1968. During this period (1960-68) the number of professional and technical workers stayed about the same, and the number of managers, salesworkers, office workers, and craftsmen dropped considerably. The occupational changes can probably be accounted for by two factors: (a) the important food industries in Maine and the important ones that increased in size between 1960 and 1968 are those with a very high proportion of production workers as a percent of total employment, namely meat products, canned and preserved foods and sugar; and (b) the decrease in the number of firms reducing the number of officials, managers, and clerical workers.

The national outlook for the food and kindred products industry suggests there will be a slight decline in manpower requirements. Employment trends for individual industries are expected to differ. For example, manpower requirements in the meat production industry are likely to decline because of increasing use of labor saving technological innovations. In contrast, modest employment gains are expected in the canned and preserved food industry group, because of the large number of small plants with little mechanization and the increase in consumer demand for dietetic and other speciality foods. Maine's employment in the food industry group is expected to rise slightly, to 14,000 in 1975.

Technological innovations expected to have some bearing on the nature of the industry's occupational structure include: more wide-spread use of conveyor and transfer systems to handle food in process; computer and environmental sensors to control preparation of food; and automatic equipment to grade, weigh and package a greater variety of foods. All occupational groups except laborers are expected to increase in size in Maine during the next seven years, the largest increase being operatives but with significant increases also in craftsmen and office and clerical workers. A small rise in the number of professional and technical workers is expected.

Textile Mill Products (SIC 22)

Approximately 12,000 workers were employed in the textile mill products major industry group in 1968. The majority of employment was divided between weaving mills, cotton, and weaving and finishing mills, woolen. Eighty-seven percent of total employment were production workers. Nationally there has been a decrease in the proportion of production workers and increasing proportion of professional and technical workers. This has also been true in Maine. Manpower requirements in the major industry group were expected to decline nationally and are also projected to decline in Maine, to about 9,700 in 1975.[4]

In terms of occupational requirements, there is a projected absolute decline for laborers and operatives and small but not significant increases in the other occupational groups. If the projections are correct, this industry will not be of great concern to educational and training planners.

---

[3] There is considerable fluctuation in employment throughout the year. Approximately 14,700 were working at the time of the survey, the summer of 1968. There were an estimated 12,700 annual average employment in the industry in 1968. All the differences were assumed to be operatives and laborers.

[4] Textile industry employment in Maine is concentrated in a few firms. According to *County Business Patterns* there are four firms with over 500 employees. Therefore, it becomes very difficult to predict what will happen and all projections here must be taken with a great deal of caution.

Apparel and Related Products (SIC 23)

Almost 4,000 workers were employed in the apparel industry group in Maine in 1968. About one-third of the workers produced men's and boys' furnishings and another one-third produced women's, misses' and children's outer wear. The remainder made men's and boys' suits and coats, miscellaneous apparel, and accessories and miscellaneous fabricated textile products. Operatives made up 85% of the total work force and production workers altogether accounted for 89% of the total employment, equal to the national average. The proportion of production workers in individual apparel industries varies only slightly around the average for the industry group.

Employment in the Maine apparel industry has increased by about 1,000 workers since 1960 and is projected by NPA to rise to about 7,000 workers in 1975. This projection apparently reflects the importance in Maine of those apparel industries which cater to the rapidly rising demand for apparel for a growing and more affluent population.

According to BLS, technological developments in the apparel industry during the next decade are expected to have relatively limited impact on employment requirements. The use of technological innovations in apparel manufacturing has been limited by problems that remain unsolved. However, the trend toward larger apparel firms should result in some increase in the labor saving equipment and production techniques in this industry. Therefore, only slight changes in the occupational structure are predicted before 1975. In spite of the large increase in employment, only operatives are expected to increase significantly; the increases in other occupational groups will be modest.

Lumber and Wood Products, Except Furniture (SIC 24)

Approximately 15,300 wage and salary workers are employed in the lumber and wood products, except furniture, major industry group in 1968. About one-third of the workers were in logging camps. Forty-four percent were producing miscellaneous wood products and 16% were working in saw mills and planing mills and the remainder were producing plywood, prefabricated wood buildings, and wood containers. Production workers made up about 84% of total employment, a figure slightly less than the national average.

Employment in this industry has been falling in past years. Employment changes vary widely in the different industry groups; for example between 1947 and 1965 employment declined almost one half in saw mills and declined more than one-half in establishments producing wooden containers. Logging camps and logging contractor employment declined only slightly. Employment in establishments producing mill wood, fire wood and miscellaneous wood products increased slightly.

The total employment in this industry is expected to decline slightly. It is projected by NPA to fall to 13,920 in Maine by 1975. Moderate changes in the occupational structure are expected during the forthcoming seven years. Growing mechanization, increasing establishment size, and shifts in industry composition will influence the industry's occupational structure. The most significant change will be the decline in the need for unskilled workers. In the logging sector, larger and more powerful tree cutting equipment will reduce the need for lumbermen and woodchoppers. In the lumber and wood processing sector, mechanization and general plant modernization will decrease the need for material movement laborers, machine operator help and other unskilled workers. Decline of laborers will be paralleled by growth in the proportion of semi-skilled operatives, needed to operate the new machinery and equipment. The proportion of mechanics and repairmen will also increase, as the result of more extensive use of modern complex machinery and equipment. Few changes are expected in the white collar occupations.

Furniture (SIC 25)

There were approximately 1100 persons employed in the furniture and fixtures major industry group for 1968. Over 80% were engaged in producing wood and upholstered household furniture. Production workers accounted for 84% of total employment, equal to the national figure. The highest proportion of production workers nationally is found in the household furniture industry group. Nationally, there has been an increase in employment in this sector. State of Maine employment has remained about constant in the past six years.

National manpower requirements in furniture industries are expected to increase by almost 20% between 1965 and 1975. The demand for household furniture will be stimulated by, among other things, continued increases in population, in new family formation, disposable personal income and in the number of families with two homes. Furniture should be an area of expansion for the State, and in spite of the lack of growth in recent years employment is projected to increase to about 1400 employees by 1975.

The application of new technology will have a significant impact on requirements for some occupations, but, in general, occupational structure is not expected to change appreciably for 1975. For example, the increasing use of automatic machinery such as automatic routers and the use of specialized semi-skilled workers in the production of cabinets is expected to reduce requirements for cabinet makers. The proportion of upholsterers is expected to decline also as the use of improved power driven faster equipment, such as nailers, staplers, tackers, and clippers becomes more widespread. Balancing the decrease in the proportion of craftsmen, however, will be increases in the proportion of foremen, and mechanics and repairmen. Occupational requirements in the State are projected to remain about the same.

Paper and Allied Products (SIC 26)

There were about 17,600 workers in the paper industry in Maine in 1968. Eighty-seven percent of these worked in establishments manufacturing pulp and paper. The remainder produced converted paper and paper board products, and paper board containers and boxes. Production workers accounted for 78% of the total wage and salary employment, exactly equal to the national average.

Paper industry employment in Maine has remained relatively constant over the past eight years, as it has nationally. Although pulp and paper production has been rising, the output per worker has been increasing as well through use of more efficient production machinery. Productivity increases thus have balanced the increased demand.

Nationally, production workers have decreased as a proportion of total employment. There are no comparable figures for Maine. Manpower requirements in establishments making paper and allied products are expected to increase substantially in the next two years, stimulated by population growth, general business expansion and rising per capita consumption of paper products. Although much of the increased production will be offset by rising productivity, employment in Maine is projected to increase to about 19,000 workers by 1975.

Technological innovations are expected to have a significant effect on employment requirements in establishments manufacturing paper and allied products, particularly in those producing pulp, paper and paper board. The latter are placing increasing emphasis on automatic quality control through instrumentation, with centralized control systems allowing a few workers to monitor and control production processes. The increasing use of electronic instruments will raise the proportion of professional and technical workers as well as the number of craftsmen. The proportion of operatives is projected to remain about the same with a substantial decrease in the proportion of laborers.

Printing, Publishing and Allied Industries (SIC 27)

About 2500 wage and salary workers were employed in the printing, publishing and allied industries major industry group in 1968 in Maine. Approximately 70% of these workers were in newspaper publishing and printing establishments with the remainder in commercial printing. A few persons work in service industries for the printing trade. Approximately 53% of the workers were production workers, somewhat below the national average of 63%. Employment in printing has risen slightly in Maine since 1960, with increases in newspaper publishing and a decline in commercial printing. Total employment nationally is expected to increase by about 12% between 1965 and 1975, although employment trends among industries comprising the printing industries major industry group are expected to differ. Employment requirements in newspaper publishing and printing are expected to decline slightly; typesetting, plate making and finishing operations will show decreases, and manpower requirements in the other sectors of this industry are expected to increase. NPA projections are for a slight decline in total employment for the printing industry in Maine to 1975. Because of the decline, only insignificant needs in printing trades employment are projected, mostly for replacements.

Rubber and Miscellaneous Plastic Products (SIC 30)

About 2500 workers are employed in the rubber and miscellaneous plastic products major industry group in 1968. About 70% of the workers were producing plastic products; the others were producing miscellaneous rubber products. Production workers accounted for about 86% of total employment of this major industry group compared with 78% nationally. Employment in this industry group doubled between 1960 and 1968, with most of the growth taking place in the plastics industry.

Nationally, there has been a declining proportion of production workers in this industry, though not in Maine. The State's proportion of production workers has risen; the number of operatives and laborers has increased while the number of craftsmen has actually declined. The number of professional and technical workers has declined to almost zero within the State. Employment is projected to increase to almost 2900 workers in 1975. There apparently is going to be increasing mechanization in the plastic products industry. However, because of the small base of workers in occupational groups other than operatives, few new workers will be needed in the other occupational groups.

Leather and Leather Products (SIC 31)

More than 30,000 wage and salary workers were employed in the leather and leather products major industry group in 1968. Eighty-eight percent of these workers were engaged in the manufacturing of footwear, except house slippers and rubber footwear. The remaining were in leather tanning and bootshoe cut stock and bindings.

Production workers accounted for 91% of employment compared with 83% nationally. Employment in the shoe industry has risen in past years in Maine, a trend opposite that of the nation where employment has fallen. There is no information about occupational requirements in the State prior to 1968. Therefore past trends are not available. Manpower requirements nationally are expected to be about the same in 1975 as they were in 1965; therefore, employment for Maine is projected to be about the same as it is in 1968.

A number of significant developments are occurring in the leather industry that will substantially affect methods of production in the next 10 years. These technological developments are expected to substantially alter the industry's occupational structure by 1975. For example, the proportion of operatives are expected to decline somewhat because of the greater use of more efficient production equipment including injection molding machine and vulcanizing equipment; thermalasting machinery, and geometric lasting equipment. The use of more leather and leather substitutes in shoe manufacturing is expected to affect employment requirements adversely for cloth cutters, lining cutters and workers engaged in mulling, treeing, splitting and skinning. Operatives, however, will still make up the largest proportion of total employment in 1975. Increasing needs for skilled mechanics and maintenance workers, and for the foremen needed to supervise increasingly complex operations are expected. Occupational requirements in Maine are projected to follow national trends.

Fabricated Metal Products (SIC 34)

There were approximately 2,200 workers employed in the fabricated metal industry in 1968 in Maine. About 50% were employed in establishment manufacturing fabricated structural metal products, such as structural steel metal doors, fabricated plate work and sheet metal work.

Production workers accounted for about 73% of total employment, somewhat below the national average. Employment in this industry has been steadily increasing in recent years with much of the increase taking place in the fabricated structural metal products industry group. The proportion of production workers in Maine has increased slightly since 1960 rising from 70% to 73%. Nationally, the proportion of production workers has remained unchanged since 1958. Manpower requirements nationally are expected to rise by about one-sixth. However, employment trends for the individual industries are expected to differ because of differences in demand and rates of adoption of labor saving technological innovation. Employment in this industry in Maine is projected to remain about constant at 2,200 workers for 1975.

Technological innovation is expected to play a part in the relatively minor changes in occupational structure in fabricated metal establishments by 1975. The transfer line techniques for machine feeding and materials handling is already utilized in this industry although its use is expected to continue to expand. Use of numerically controlled machine tools, however, is somewhat less common in fabricated metal establishments and their use should increase significantly over the decade ahead. Some operative groups, such as assemblers, inspectors, electric platers, and machine tool operators will probably be adversely affected by the increasing use of automatic transfer equipment and numerically controlled machines as well as other developments. The proportion of craftsmen is not expected to change very much during the next few years. But, like operatives some shifts within the occupational group are expected. For example, in view of the greater efficiency and speed of numerically controlled machine tools, metal working craftsmen such as production and tool machinists can expect to find their relative position somewhat diminished. On the other hand, ratios of foremen and mechanics and repairmen should rise as a result of needs for increased supervision and maintenance of new and more complex mechanical equipment. The only occupational change projected for Maine industry is a rising proportion of professional and technical workers and a declining proportion of laborers. Other occupational groups are expected to stay about the same.

Machinery, Except Electrical (SIC 35)

There were about 2600 employees in the machinery production major industry group in 1968. Production workers accounted for 73% of total employment, a little higher than the national average. Employment is less now than in 1960, but the trend has been up in recent years. Nationally, manpower requirements are expected to increase by nearly 20% between 1965 and 1975 as a result of increasing demand for machinery and related equipment. Employment in Maine is projected to increase to about 3,000 workers by 1975.

The largest occupational group in the State were craftsmen, 37% of the workers. Next largest was operatives with about 30% of the workers. Technological changes, which are expected to influence the occupational structure in this major industry group in the future include the greater use of numerically controlled machine tools, automatic transfer equipment, production control instruments and electronic computers.

Occupational structure is expected to change significantly by 1975. Changes projected in Maine are a rise in professional and technical workers, a small rise in officials and managers, about the same proportion of craftsmen and operatives, and a decline in the proportion of laborers.

Electrical Machinery, Equipment, and Supplies (SIC 36)

This has been one of the fastest growing industries in Maine, increasing in employment from 2500 to 4500 between 1960 and 1968, a rate much faster than national growth. About 70% of the 4500 workers were engaged in the manufacture of electronic components and accessories. The remainder were producing communication equipment and lighting and wiring devices. Total industry employment of 6700 is projected for 1975.

Nationally, there has been a decreasing proportion of production workers, reflecting the more extensive employment of scientific and technical manpower in the communications equipment industry; in Maine the proportion of production workers has increased drastically since 1960. While employment in the State rose by more than 200 workers in eight years, the number of white collar workers actually declined, mainly a decline in professional and technical workers. At present, production workers make up 76% of total employment nationally in the electronic components and accessories industry; in Maine the comparable figure is 85%. Nationally, professional and technical workers make up 17% of total employment; in Maine the comparable figure is 4%.

Nationally, operatives account for more than 4 out of every 10 workers in this major industry group; in Maine it was 7 out of 10. Large numbers of assemblers and inspectors are employed, reflecting a relatively low level of mechanization in the assembly process for complex electronic products. Technological innovation is expected to have a significant impact on production processes and therefore on occupational structures in this major industry group in the years ahead. Although mechanization of assembly is a distinct possibility, no great headway is expected in the next decade. The occupational structure in Maine is projected to reverse the trend found in the last year and more closely follow the national trends with a small rise in the proportion of professional and technical workers and a small decrease in the proportion of laborers.

Transportation Equipment (SIC 37)

There were approximately 5100 wage and salary workers employed in the transportation equipment major industry group in Maine in 1968.[5] About 80% of these workers were employed in ship building and boat building, about 20% were employed in manufacturing of aircraft and parts and a small number were producing motor vehicle equipment.

Production workers accounted for about 79% of total employment in Maine, compared with 71% nationally, a result of the high proportion of employment in ship building and repair. Nationally, employment in the transportation equipment industry has increased substantially in recent years. Employment has increased rapidly in aircraft and parts because of overall increases in government procurement of aircraft and missles and increased demand for commercial airplanes. Employment in ship and boat building and repair has remained fairly constant since 1953, a level below the World War II level. The proportion of production workers as a proportion of total employment has stayed about constant since 1960.

Future manpower requirements are difficult to predict in this industry. Nationally manpower requirements are expected to decline in the aircraft and parts group since output per worker is expected to outstrip a reatively stable demand for military and commercial aircraft. Employment in ship and boat building industries is expected to increase moderately nationally. However, employment in these areas is subject to governmental policy in regard to ship building. NPA has projected transportation equipment employment in Maine to be 8200 in 1975 (the figure excludes Kittery Naval Shipyard). This figure is probably high if past trends are taken into account; this figure is probably low if one is very optimistic for the future of the ship building industry in Maine. We accept the NPA projection and work on this basis. The occupational structure is expected to shift slightly with an increasing proportion of professional and technical workers, a decreasing proportion of laborers and the rest of the occupational distribution to remain about constant.

Transportation and Public Utilities (SIC 40 to 49)

There were about 17,500 workers employed in transportation and public utilities industry division in 1968 in Maine. About half of total transportation and public utility employment was concentrated in two major industry groups—trucking and warehousing (SIC 42) and communications (SIC 48) each of which represented about one-fourth of employment. Railroads accounted for about 3,600 workers or about a little over one-fifth of total employment in this division (railroads are excluded from the scope of study), while utilities and sanitary services (SIC 49) accounted for about 20%. Other major industry groups employing smaller proportions included local and interurban passenger transit, water transportation, air transportation, pipeline transportation and transportation services. Total employment in this industry division has not changed very much since 1960.

---

[5] These figures exclude workers at the Kittery Naval Shipyard.

Nationally, manpower requirements in this industry division are expected to increase moderately through the mid 1970's. Employment in the State of Maine is expected to remain about constant. Motor freight transportation is projected to increase. Communications and utilities are projected to drop slightly. Significant numbers of persons will be required in certain occupations within these industry groups.

Trucking and Warehousing (SIC 42)

There were about 4,400 wage and salary workers employed in the motor freight transportation and storage major industry groups in Maine in 1968, a slight decline from the 1960 figure. Nationally, manpower requirements are expected to increase by one-fourth between 1965 and 1975. Employment in Maine is expected to rise to about 4,800 workers by 1975.

More than half of all the workers employed in the motor freight and warehousing major industry group in 1960 were truck and tractor drivers.

Changing technology during the next few years will significantly increase output per worker. These technological developments are expected to change the industry's occupational structure somewhat nationally and in Maine. As a percent of total employment, laborers are expected to decline, particularly in the warehousing industry.

The greatest employment growth in this major industry group is expected to occur among larger firms. Compared to small organizations larger companies hire considerably higher proportions of clerical workers, mechanics and repairmen, service workers and foremen. These workers are expected to increase their share of total employment as the trend toward larger firms continues. Customarily managers make up a greater proportion of employment in smaller firms because they often carry out many functions that are assigned to other occupational groups in larger organizations. Therefore a decline in the proportion of managers, officials, and proprietors is expected in trucking as the number of larger firms increases.

Communications (SIC 48)

Approximately 4,200 workers were employed in the communications major industry group in Maine in 1968. In the nation about eight out of ten were employed by companies providing telephone services. The remaining workers were employed in radio broadcasting and television, telegraph communications and communications services not elsewhere classified. Manpower requirements are expected to rise slightly nationally. Employment trends for the individual industry groups are expected to differ widely, increases in demand in many cases being offset by increasing use of labor saving technological innovations. Employment in the State of Maine is projected to decline slightly to 4,000 employees by 1975.

White collar workers have made up 70% of the total employment in the nation and in Maine. This high proportion reflected employment of the large numbers of clerical workers in the telephone industry and technicians and managers in radio broadcasting and television. Craftsmen made up a very large percent of the blue collar workers. Operatives, laborers, and service workers accounted for only a small proportion of employment. Occupational structure in the communications major industry group is dominated by that of the telephone industry. Occupational patterns in telephone industry group are expected to change slowly by 1975. The proportion of clerical workers is expected to decline as direct dialing, automatic billing of long distance calls, etc. reduce requirements for telephone operators. Craftsmen are expected to rise as a proportion of total employment in spite of technological innovations which tend to reduce requirements for these workers. Professional and technical workers are expected to rise in proportion mainly because of increasing needs for these workers to design, service, and modify the complex equipment used in the industry.

Public Utilities (SIC 49)

In Maine, an estimated 3,100 wage and salary workers were employed in this major industry group in 1968, a decline from 1960. Nationally, employment requirements are expected to remain at about the same level. In Maine they are projected to decline slightly to 2,900 workers by 1975. In general, a very large anticipated increase in industry activities is expected to be completely offset by rising output per worker resulting from increasing use of labor saving technological innovations.

Because of the decline in projected employment the only important need is for professional and technical workers.

Wholesale and Retail Trade (SIC 50-59)

There were a total of 61,600 workers employed in this industry division in Maine at the time of the survey. An estimated 5% of these workers were seasonal (based upon past patterns, average annual employment would be about 5% less than the July-August total). About one-fourth of these workers were employed in wholesale trade, the remainder in a variety of retail firms. Employment in this industry division has been rising in the last three or four years in Maine after holding steady since 1960. Manpower requirements in wholesale and retail trade are expected to increase nationally by over one-fourth between 1965 and 1975. A somewhat lower rate of increase is projected for Maine since population growth will be slower in this State than nationally. Employment growth will be stimulated by increases in population and consumer expenditures, but will be slowed somewhat by the increase in the application of labor saving technology (such as the greater use of electronic data processing equipment, automated warehousing equipment, growth in the number of self-service stores and the growing use of vending machines).

Labor requirements are expected to increase slightly faster in retail than in wholesale trade. The occupational distribution in wholesale trade is expected to shift slightly toward larger proportions of professional and technical workers and craftsmen and slightly smaller proportions of managers and laborers. The smaller proportion of managers is expected because of the increasing size of establishments. The rising proportion of craftsmen reflects a greater need for foremen and mechanics and repairmen to supervise the operation and repair of the increasingly complex mechanized materials handling equipment.

The personal nature of retailing activities most likely insulate the industry occupational structure during the decade ahead from substantial changes resulting from technological innovations. A decline is expected in the ratio of managers, officials, and proprietors because of increasing establishment size. Craftsmen are expected to increase as a proportion of total employment primarily from an increase in the proportion of mechanics and repairmen and especially motor vehicle mechanics employed in motor vehicle and accessory establishments.

Finance, Insurance and Real Estate (SIC 60-67)

There were approximately 11,500 wage and salary workers employed in the finance, real estate, and insurance industry division in 1968 in Maine. Insurance accounted for 35% of the employment in this division. Banking and accounting accounted for nearly 60% and the remainder were employed in real estate.

Employment in this industry division has been increasing in recent years both nationally and in the State of Maine. Finance, insurance and real estate activities expanded markedly with the post war industrial and population growth. Manpower requirements were expected to increase by approximately 40% between 1965 and 1975. Employment growth will be stimulated by the same factors that influenced growth during the post war period, increasing population, rising income levels, and a growing use of credit and checking accounts. However, employment growth should be slower than in the past decade primarily because of increasing use of electronic data processing equipment. Employment in the State of Maine is projected to increase to 12,800 by 1975, a 25% increase over 1965.[6]

The complicated financial transactions of today's business world requires the services of hundreds of thousands of white collar workers. White collar workers make more than 9 out of every 10 workers employed in finance. The majority of these are clerical workers.

Technological change is expected to have significant affect on employment requirements in finance during the mid 1970's, which will be felt primarily by workers in the clerical occupational group. In Maine there has been a rapidly rising proportion of office and clerical workers in the finance group. This trend is projected to be reversed to a slight decline in the proportion of office and clerical workers as projected by 1975. A major change is a rising proportion of officials and managers, reflecting a relatively large number of financial establishments including branch banks and investment establishments.

Services and Miscellaneous Industries (SIC 70-89)[7]

There were approximately 16,500 workers employed in this major industry division in Maine excluding those not in the scope of the study. The employment includes a wide variety of firms and occupations. Service employment is greatly influenced by seasonal factors and the total employment for July, 1968 has been reduced by several thousands to compensate for the seasonal factors.

---

[6] This employment projection is substantially lower than the 16,000 projection of NPA. Based upon past trends and projected growth for New England from the New England Commission study we simply did not think the use of the NPA projection was warranted.

[7] Including hotels, rooming houses, camps and other lodging places, personal services, miscellaneous business services, automobile repair, automobile services and garages, miscellaneous repair services, motion pictures, amusement, recreation services except motion pictures, legal services, and miscellaneous services. Excluded from the scope of study are medical other health services, educational services, museums, art galleries, botanical and zoological gardens and non-profit membership organizations all of which are included in this major industry division.

This is an important sector of the State's economy but very little is known about the behavior of its component parts. This division has one of the highest proportion of professional workers in the economy. Total employment is expected to grow moderately to about 18,000 by 1975. Highest growth is expected in the business services sector (SIC 73) and the legal and other miscellaneous services sector (SIC 81 and 89). These increases have influenced the projections for occupational change. Professional and technical workers are projected to increase in proportion, as are clerical workers, while declines are projected for service and operatives.

Public Administration (SIC 91, 92, 93)

Approximately 27,700 wage and salary workers employed in federal, state and local government in 1968 were included within the scope of this study. The figure excludes government workers in education and health and hospitals and at the Kittery Naval Shipyard. About 5,100 workers were in local government, 14,600 in federal government, and 8,000 were employed in state government.

Nationally, and in the State of Maine, government employment has been increasing since World War II. In the last decade, the largest increase in government employment has been at the state level, but employment at local levels also increased very rapidly. Federal government employment in the State of Maine has remained very constant in the past seven or eight years. Much of the increase has taken place in education and health (which are outside the scope of our study), but there have been increases in State and local government employment resulting from an increasingly urban population and the need to expand welfare and protective services.

Manpower needs are expected to increase in the future because of the demand for more government services. Federal employment is expected to increase only slightly, generally in non-defense programs. Total employment in the areas covered by this study in Maine is expected to increase to 30,400 by 1975. Technological development (automatic data processing, quick copy devices, data transmission and communication networks and materials handling equipment) is not expected to be a significant factor in limiting employment growth at the local government level. At the federal and State level, however, labor saving devices are expected to have an impact on employment because centralization of functions lends itself to wider use of these developments. The occupational distribution in the State is projected to shift slightly toward greater proportions of professional and technical and service workers and smaller proportions of clerical and blue collar workers.

Occupational Needs for the State of Maine

Chapter 3

This chapter contains: (1) a summary of projections for each occupational group, including needs for specific occupations in the industries most likely to need workers; (2) the entry jobs into each industry-occupational group; and (3) a summary of the training and education requirements for the entry jobs. The detailed information on which these summaries are based will be found in the appendices. Appendix A contains occupational projections and estimates of total needs for each industry included in the study. Education and training requirements for the specific entry jobs most likely to need workers are contained in Appendix B.

The education and training requirements for entry jobs are those reported by the firms interviewed during the summer of 1968.[1] Although hiring practices undoubtedly will change because of technological change or market conditions, the requirements listed probably represent as good an estimate of future requirements as is available. Asked if they expected the reported education and training requirements to change, fewer than 8% of the firms expected any change in hiring requirements, except for one occupational group, technical workers, in which 11% of firms expected change. Most of the firms which did predict change expected requirements to tighten because of technological reasons.

Professional and Technical Workers

National trends. Nationally, the professional and technical workers occupational group doubled in size between 1945 and 1965. By 1975, total employment is expected to be 45% higher than the 1965 figure—the fastest growth rate of any occupational group. Among the largest occupation groups in this category are scientists and engineers (under professional workers), and engineering and science technicians (among the technicians). Needs for scientists are expected to increase more rapidly than for engineers. Needs for engineering and science technicians or aides are expected to rise quite rapidly, stemming to some extent from increased utilization of professional level workers and assumption of some of their tasks by less highly trained technicians. Employment needs for these workers are expected to grow more rapidly than needs for the engineers and scientists they assist.

The need for accountants is expected to increase rapidly in the 1970's due to continued business expansion, increasing complexity of business and operations, and increasing use of accounting services by small business organizations. The growing use of computers and electronic data processing machines will lower the need for junior accountants, while the need for accountants with college degrees will increase.

Employment of draftsmen doubled between 1950 and 1965, largely from rapid growth in demand for durable goods products. The consequent expansion of industries requiring numbers of engineers and scientists also increased the demand for draftsmen. Draftsmen with some post-high school training will be most in demand. Manufacturing needs such as machinery, electrical equipment, fabricated metals and transportation equipment use the greatest number of draftsmen. In non-manufacturing employment engineering and architectural firms, construction companies and public utilities have the greatest needs.

---

[1] Each firm was asked about the "positions you usually fill from outside the company, rather than by internal transfer or promotion, in each of the occupational groups . . . please list the names of the jobs usually filled from outside the company . . . What is the minimum number of years of schooling you currently require for hiring someone for each of these jobs? What kind of education, training and/or related experience do you require for hiring someone for these jobs?"

Maine Trends. Growth of professional and technical workers is projected for Maine, but at a slower rate than found nationally. Table III-1 lists those industries needing a significant number of professional and technical workers by 1975. Increases resulting from technological change and, in some cases, growth in total employment, are shown in the first column. The remainder of the needs are for workers to replace men and women who retire, are promoted, or die; these are shown in the second column. For example, in the transportation equipment and machinery industries the largest part of total needs is a result of the growth in total employment projected for 1975. Considerably less growth is projected for the paper industry—here, the needs are largely replacements for existing workers.

Projected growth among specific occupations is contained in Table III-2, based upon staffing patterns in the State reported in the 1960 Census and the growth trends for specific occupations as reported by BLS. The right hand column shows total growth; there will be about 5,000 professional and technical workers needed in Maine by 1975. About 40% of the needs are in the service industry, largely in business and legal services. About 25% of the professional-technical workers will be needed in manufacturing, mostly in the five industries shown in the table. The specific professional and technical occupations with the largest needs are engineers, accountants, technicians, and "other professional and technical."

In manufacturing, only the larger firms hire professional and technical workers. For example, in the paper industry all but two firms interviewed with more than 100 workers had professional workers and most had technical workers. Among firms with less than 100 workers, only one had professional workers; and the same was true for technical workers.

Tables III-3 and III-4 list the entry jobs for professional and technical workers, respectively, for industries most likely to have additional jobs. The tables also contain the number of persons in each of these entry jobs as a proportion of the total number of professional or technical workers in the industry. For example, all persons in the transportation equipment industry classed as technical workers (Table III-4) were in entry jobs; 89% were draftsmen. As another example, 27% of the 83 persons in the fabricated metals industry classified as professional workers were in entry jobs, all engineers (Table III-3). The remaining 73% were promoted from within the company, either from the entry job of engineer or from some other job. A position such as senior engineer is one very likely to be filled from the entry job of engineer. A professional job, such as accountant, is apparently filled from within the company. Tables III-3 and III-4 add depth to the information about needs found in Table III-2. Table III-2 shows that there will be additional accountants needed in the fabricated metals industry. However, Table III-3 shows that the prevailing practice is for accountants' jobs to be filled from within the company. This last example is the exception, since the majority of professional and technical jobs are entry positions.

Tables III-5 - III-8 contain the education and training requirements for professional and technical entry jobs. About 10% of professional entry jobs

TABLE III-1

New and Replacement Professional and Technical Workers Needed to 1975, by Industry

SIC	Industry	Additional Workers Needed	Replacements Needed	Total Needs
26	Paper	98	476	574
37	Transportation Equipment	267	44	311
36	Electrical Machinery	152	37	189
20	Food	41	30	71
35	Non-electrical Machinery	36	18	54
34	Fabricated Metals	17	32	49
91-93	Public Administration	1179	917	2096
70-89	Miscellaneous Services	558	325	883
50	Wholesale Trade	100	54	154
60-67	Finance, Insurance, Real Estate	60	77	137
48	Communications	42	94	136
15-17	Contract Construction	84	51	135
49	Utilities and Sanitary	13	57	70
52-59	Retail Trade	–32	113	81

TABLE III-2
Total Needs to 1975 for Professional & Technical Worke

	Manufacturing Industries								
	Food (20)	Transportation Equipment (37)	Paper (26)	Electrical Machinery (36)	Non-electrical Machinery (35)	Fabricated Metals (34)	Other Mfg.	Contract Construction (15-17)	Other Transportation (41, 42 44-47)
Total Needs to 1975	71	219	574	189	54	49	211	135	42
Accountants, Auditors	8	9	52	6	4	8	21	12	35
Architects	–	–	–	–	–	–	–	–	–
Chemists	2	4	63	2	–	1	15	–	–
Designers, Draftsmen	–	35	23	8	6	9	11	8	–
Engineers:	17	90	143	93	25	21	23	65	–
Chemical	–	–	23	–	–	–	–	–	–
Civil	2	–	6	2	–	3	–	59	–
Electrical	2	9	11	45	3	1	–	–	–
Industrial	–	18	23	19	6	2	8	–	–
Mechanical	12	31	34	8	10	4	–	3	–
Other Technical Engrs.	7	33	46	19	6	11	15	3	–
Lawyers & Judges	–	–	–	–	–	–	–	1	–
Medical & Dental Technicians	–	–	–	–	–	–	–	–	–
Personnel & Labor Relations	2	13	17	–	–	1	10	1	–
Social Scientists	–	–	–	–	–	–	–	–	–
Social & Welfare Workers	–	–	–	–	–	–	–	–	–
Surveyors	–	–	–	–	–	–	–	12	–
Technicians, except Medical	20	53	149	72	12	5	40	18	1
Other Professional, Technicial & Kindred	22	13	126	8	8	4	91	16	6

TABLE III-3
Entry Jobs — Professional Workers and the Proportion of
Each Entry Job, by Industry

	Manufacturing Industries							
	Transportation Equipment (37)	Electrical Machinery (36)	Non-electrical Machinery (35)	Fabricated Metals (34)	Paper (26)	Food (20)	Contract Construction (15-17)	Other Transportation (41, 44-47)
Engineer	87%	70%	84%	27%	29%	26%	49%	25%
Accountant, Auditor	4	5	7		10	16	12	16
Medical Worker	1	1	2		3	9		
Metallurgist	2							
Systems Analyst		1						
Industrial Relations or Personnel Director		1			1			
Forester					1			
Chemist					18	8		
Judges & Lawyers								3
Announcers, Newsmen, Disc Jockeys, News Photographers								
Writers								
Pharmacists								
Entertainers & Musicians								
Trust experts								
Architects & Designers & Surveyors								
Teacher								
Athlete								
Morticians								
Librarians								
Social Scientists								
Natural Scientists						8		
City Administrators								
Other	1		2		6	9	3	27
Total	95	78	95	27	68	77	64	71
Total number of professional workers shown in parentheses	(110)	(96)	(54)	(83)	(568)	(85)	(170)	(48)

TABLE III-2

Needs to 1975 for Professional & Technical Workers, by Specific Occupation

ries			Non-Manufacturing Industries											
c- ry	Fabricated Metals (34)	Other Mfg.	Contract Construction (15-17)	Other Transportation (41, 42 44-47)	Communications (48)	Utilities and Sanitary (49)	Wholesale Trade (50)	Retail Trade (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)	Total Mfg.	Total Non-Mfg.	Gran Tot
	49	211	135	42	136	70	154	81	137	883	2096	1367	3734	510
	8	21	12	35	4	10	54	7	59	138	251	108	570	67
	–	–	–	–	–	–	–	–	3	13	–	—	16	1
	1	15	–	–	–	5	–	–	–	22	147	87	174	26
	9	11	8	–	–	4	–	6	–	57	21	92	96	18
	21	23	65	–	87	32	75	7	13	94	252	412	625	103
	–	–	–	–	–	–	–	–	–	–	–	23	—	2
	3	–	59	–	–	11	–	–	5	27	84	13	186	19
	1	–	–	–	72	15	–	–	–	12	21	71	120	19
	2	8	–	–	–	1	8	–	8	12	42	76	71	14
	4	–	3	–	3	3	15	3	–	7	21	99	55	15
	11	15	3	–	12	2	52	4	–	36	84	137	193	33
	–	–	1	–	–	–	–	–	8	258	105	—	372	37
	–	–	–	–	–	–	–	–	–	1	21	—	22	2
	1	10	1	–	–	1	–	–	4	–	126	43	132	17
	–	–	–	–	–	–	–	–	8	12	42	—	62	6
	–	–	–	–	–	–	–	–	–	–	126	—	126	12
	–	–	12	–	–	1	–	–	–	27	21	20	61	8
	5	40	18	1	–	15	11	1	–	39	210	331	295	62
	4	91	16	6	44	4	14	59	42	211	797	272	1193	146

TABLE III-3

Jobs — Professional Workers and the Proportion of Professional Workers in Each Entry Job, by Industry

					Non-Manufacturing Industries						
Paper (26)	Food (20)	Contract Construction (15-17)	Other Transportation (41, 44-47)	Trucking and Warehousing (42)	Communications (48)	Utilities and Sanitary (49)	Wholesale Trade (50)	Retail Trade (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
29%	26%	49%	25%	%	23%	24%	19%	4%	6%	8%	4%
10	16	12	16	100	1	9	25	6	32	20	2
3	9									3	5
1						5	3	1	1		
1									1	1	4
18	8										
			3			2			2	15	5
					44						
					1						
								60			
								4		5	
									3		
										7	
										4	3
										3	
										6	
											1
											15
	8										3
											1
6	9	3	27		29		5	3	8	4	21
68	77	64	71	100	98	40	52	78	52	76	63
(568)	(85)	(170)	(48)	(9)	(337)	(141)	(177)	(531)	(346)	(1610)	(3790)

TABLE III-4

Entry Jobs — Technical Workers and Proportion of
Each Entry Job, by Industry

	Manufacturing Industries							
	Transportation Equipment (37)	Electrical Machinery (36)	Non-electrical Machinery (35)	Fabricated Metals (34)	Paper (26)	Food (20)	Contract Construction (15-17)	Other Transpo tation (41, 44-47)
Computer Programmer	2%	%	5%	1%	1%	7%	1%	%
Draftsmen, Surveyors	89	7	65	35	6	3	29	
Engineering Aide		25	5	6		4	33	
Quality Control Engineer	6	4						
Electrical Technician		28					3	
Radio Operator								
Electronics & Radio Technicians								27
Student Pharmacists								
Technicians								
Photographers								
Mortuary Assistant								
Laboratory Technicians						67		
Geology Technicians								
Natural Scientists								
Medical & Health								
Other	3		24	52	68	5	6	
Total	100%	63%	100%	94%	75%	85%	72%	27%
Total number of Technical Workers shown in parentheses	(142)	(114)	(48)	(98)	(632)	(86)	(125)	(16)

TABLE III-5

Education and Training Requirements for Professional Ent

					Years	
Training	Total	No Requirements	4-8	9-11	12	1 Pos
None	29	4	2	—	5	
None-will train	1	1	—	—	—	
Experience	33	2	—	—	5	
Apprenticeship	—	—	—	—	—	
Short Training Course	2	—	—	—	2	
Specialized H.S. Course	1	—	—	—	—	
Special Courses	—	—	—	—	—	
Technical Institute	38	—	—	—	4	
Specialized College	193	1	—	—	2	
Mixed	6	—	—	—	1	
Total	303	8	2	—	19	

TABLE III-6

Education and Training Requirements for Professional Entry

					Years	
Training	Total	No Requirements	4-8	9-11	12	1 Po
None	38	—	—	—	7	
None—will train	20	3	—	—	7	
Experience	94	10	1	—	21	
Apprenticeship	1	—	—	—	1	
Short Training Course	25	11	—	1	10	
Specialized H.S. Course	1	—	—	—	1	
Special Courses	—	—	—	—	—	
Technical Institute	45	—	—	—	7	
Specialized College	447	1	—	—	11	
Mixed	2	—	—	—	—	
Total	673	25	1	1	65	

TABLE III-4

Jobs — Technical Workers and Proportion of Technical Workers in Each Entry Job, by Industry

Paper (26)	Food (20)	Contract Construction (15-17)	Other Transportation (41, 44-47)	Trucking and Warehousing (42)	Communications (48)	Utilities and Sanitary (49)	Wholesale Trade (50)	Retail (Trade) (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
		Non-Manufacturing Industries									
1%	7%	1%	%	20%	%	%	2%	%	76%	7%	1%
6	3	29				1	3	8		38	1
	4	33		80		6	2	3		6	40
		3									
						4					
			27		27		13	21			
								10			
									6		1
										7	
										8	
	67									3	6
										1	
											2
											3
68	5	6			51	9	53	47	3	7	11
75%	85%	72%	27%	100%	78%	20%	73%	88%	85%	77%	66%
(632)	(86)	(125)	(16)	(9)	(201)	(164)	(147)	(115)	(93)	(467)	(1445)

TABLE III-5

and Training Requirements for Professional Entry Jobs in Manufacturing

al	No Requirements	4-8	9-11	12	12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
		Years of School								
9	4	2	—	5	3	2	—	9	4	—
1	1	—	—	—	—	—	—	—	—	—
3	2	—	—	5	2	3	—	21	—	—
-	—	—	—	—	—	—	—	—	—	—
2	—	—	—	2	—	—	—	—	—	—
1	—	—	—	—	1	—	—	—	—	—
-	—	—	—	—	—	—	—	—	—	—
8	—	—	—	4	3	12	9	9	1	—
3	1	—	—	2	—	1	—	174	15	—
6	—	—	—	1	—	1	—	4	—	—
3	8	2	—	19	9	19	9	217	20	—

TABLE III-6

d Training Requirements for Professional Entry Jobs in Non-Manufacturing

al	No Requirements	4-8	9-11	12	12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
		Years of School								
8	—	—	—	7	3	4	—	21	3	—
0	3	—	—	7	2	2	—	5	1	—
4	10	1	—	21	4	8	1	44	5	—
1	—	—	—	1	—	—	—	—	—	—
5	11	—	1	10	—	2	—	1	—	—
1	—	—	—	1	—	—	—	—	—	—
-	—	—	—	—	—	—	—	—	—	—
5	—	—	—	7	1	24	9	4	—	—
7	1	—	—	11	—	1	5	268	161	—
2	—	—	—	—	—	—	1	1	—	—
3	25	1	1	65	10	41	16	344	170	—

Table III-7

Education and Training Requirements for Technical Entry Jobs in Manufacturing

Training	Total	No Requirements	4-8	9-11	12	Years of School 12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
None	13	4	—	—	6	1	1	1	—	—	—
None—will train	19	2	—	—	12	4	1	—	—	—	—
Experience	44	7	2	—	14	1	14	4	2	—	—
Apprenticeship	7	—	—	—	6	—	1	—	—	—	—
Short Training Course	5	—	—	—	4	—	1	—	—	—	—
Specialized H.S. Course	—	—	—	—	—	—	—	—	—	—	—
Special Courses	3	—	—	—	3	—	—	—	—	—	—
Technical Institute	67	1	—	—	9	16	35	3	3	—	—
Specialized College	12	—	—	—	1	—	3	1	7	—	—
Mixed	—	—	—	—	—	—	—	—	—	—	—
Total	170	14	2	—	55	22	56	9	12	—	—

Table III-8

Education and Training Requirements for Technical Entry Jobs in Non-Manufacturing

Training	Total	No Requirements	4-8	9-11	12	Years of School 12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
None	18	—	—	—	4	2	6	4	2	—	—
None—will train	19	—	—	—	9	4	6	—	—	—	—
Experience	66	4	—	—	21	7	25	2	5	2	—
Apprenticeship	2	—	—	—	—	—	2	—	—	—	—
Short Training Course	12	3	—	—	1	5	3	—	—	—	—
Specialized H.S. Course	—	—	—	—	—	—	—	—	—	—	—
Special Courses	3	—	—	—	3	—	—	—	—	—	—
Technical Institute	82	3	—	—	8	11	57	3	—	—	—
Specialized College	16	—	—	—	—	—	5	2	8	1	—
Mixed	6	—	—	—	2	1	—	—	3	—	—
Total	224	10	—	—	48	30	104	11	18	3	—

require a high school degree or less; the remainder require some kind of post-high school training or some college preparation. Examples of professional jobs that do require technical institute or some other kind of post-high school training are cameramen and news photographers, writers, and announcers, newsmen, and disc jockeys in the communication industry, librarians in the government, and morticians. (See Appendix B).

About 65% of the technician entry jobs in manufacturing require technical institute or some other kind of post-high school training. The particular jobs most likely to require technical institute training are draftsmen, engineering aides, computer programmers in manufacturing and finance and real estate, embalmers, mortuary assistants and electronics technicians in wholesale and retail trade, communications and electrical machinery and natural scientists and laboratory technicians in federal, state, and local government. (See Appendix B).

Officials and Managers

Nationally this occupational group has grown faster than total employment. The occupations most frequently found in this group include traffic managers, purchasing agents, and public relations workers. Salaried managers have grown faster than self-employed proprietors since 1947 due in large part to growth in the size and increase in the complexity of business operations. These trends are expected to continue into the 1970's.

There will be an estimated need for an additional 5,958 managers in Maine by 1975. Many of these are for replacements. About 30% of this new employment will be in manufacturing stemming from high replacement needs in paper and leather and from industry expansion in transportation equipment, food and apparel. (Table III-9) In those manufacturing industries where there is a substantial need for workers, about one-third of the firms have entry jobs at this level, most likely firms of over 100 employees (Table III-10). Specific

TABLE III-9

New and Replacement Managerial Workers Needed to 1975, by Industry

SIC	Industry	Additional Workers Needed	Replacements Needed	Total Needs
37	Transportation Equipment	245	65	310
26	Paper	138	173	311
23	Apparel	145	33	178
31	Leather	5	139	144
36	Electrical Machinery	74	39	113
35	Non-electrical Machinery	71	39	110
20	Food	82	131	213
	Other Manufacturing	–243	414	171
	Total Manufacturing			1550
91-93	Public Administration	342	504	846
60-67	Finance, Insurance, Real Estate	438	396	834
50	Wholesale Trade	254	406	660
52-59	Retail Trade	–535	1286	751
70-89	Miscellaneous Services	65	354	419
48	Communications	43	86	129
15-17	Contract Construction	380	277	657
	Other Manufacturing	– 68	180	112
	Total Non-Manufacturing			4408
	Total Manufacturing			1550
	Grand Total			5958

TABLE III-10

Entry Jobs — Managers, Officials & Proprietors, and the Proportion of these Workers in Each Entry Job, by Industry

	Manufacturing Industries						
	Food (20)	Transportation Equipment (37)	Paper (26)	Apparel (23)	Leather (31)	Electrical Machinery (36)	Non-electrical Machinery (35)
Officials	2%	3%	%	%	1%	%	1%
Buyers, Purchasers	1	2	1	1	1	1	2
Managers, Supervisors, Department Heads	27	31	24	51	27	30	32
Total	30%	36%	25%	52%	29%	31%	35%
Total number of managerial workers shown in parentheses	(750)	(372)	(989)	(188)	(799)	(221)	(225)

	Non-Manufacturing Industries									
	Contract Construction (15-17)	Communications (48)	Utilities and Sanitary (49)	Trucking and Warehousing (42)	Other Transportation (41, 44-47)	Wholesale (Trade) (50)	Retail (Trade) (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
Officials	6%	5%	4%	9%	22%	5%	2%	10%	10%	13%
Buyers, Purchasers	0.5			1	2	2	2	24	1	2
Managers, Supervisors, Department Heads	13	14	14	23	15	21	19	34	32	29
Total	19%	19%	18%	33%	39%	27%	23%	68%	43%	44%
Total number of managerial workers shown in parentheses	(1582)	(493)	(233)	(446)	(310)	(2330)	(7346)	(2275)	(1825)	(2880)

Table III-11

Education and Training Requirements for Officials and Managers Entry Jobs in Manufacturing

Training	Total	No Requirements	4-8	9-11	12	12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
					Years of School						
None	61	18	1	—	24	6	2	—	10	—	—
None—will train	16	4	—	—	10	—	—	—	2	—	—
Experience	155	37	—	—	80	7	8	1	21	1	—
Apprenticeship	—	—	—	—	—	—	—	—	—	—	—
Short Training Course	8	3	—	—	3	—	1	—	1	—	—
Specialized H.S. Course	1	—	—	—	1	—	—	—	—	—	—
Special Courses	2	—	—	—	2	—	—	—	—	—	—
Technical Institute	46	—	—	—	5	10	18	5	5	3	—
Specialized College	92	—	—	—	5	2	1	—	80	4	—
Mixed	5	—	—	—	—	—	2	—	3	—	—
Total	386	62	1	—	130	25	32	6	122	8	—

Table III-12

Education and Training Requirements for Officials and Managers Entry Jobs in Non-Manufacturing

Training	Total	No Requirements	4-8	9-11	12	12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
					Years of School						
None	262	—	9	7	192	9	14	—	29	2	—
None—will train	111	19	—	1	61	11	3	—	16	—	—
Experience	722	125	6	10	370	43	27	3	135	3	—
Apprenticeship	—	—	—	—	—	—	—	—	—	—	—
Short Training Course	68	11	—	1	50	3	2	—	1	—	—
Specialized H.S. Course	10	—	—	—	9	—	1	—	—	—	—
Special Courses	32	—	—	—	28	2	2	—	—	—	—
Technical Institute	156	—	—	—	20	35	79	5	14	3	—
Specialized College	288	—	—	—	8	—	3	6	256	15	—
Mixed	7	1	—	1	—	—	2	1	2	—	—
Total	1656	156	15	20	738	103	133	15	453	23	—

entry jobs in this occupational group in manufacturing are department heads, purchasing agents, traffic managers and the like. Training and education requirements for manufacturing firms are shown in Table III-11. A college degree is required for managerial workers in 38% of the manufacturing firms with entry jobs for department heads, and 65% of firms with the entry job of official. Experience is the next most often occurring requirement for department heads, officials, buyers, and purchasers, with technical education and training being required for buyers in only 14% of the manufacturing firms with entry jobs. (See Appendix B)

In non-manufacturing, the industries with the greatest needs for managerial workers will be government, wholesale and retail trade, finance, insurance, and real estate, construction, and services. Generally only part of the managerial jobs are filled from outside the company, ranging from 19% in construction to 44% in government and 68% in finance, insurance and real estate. The entry jobs are officials, buyers, and managers, supervisors and department heads. There is a wide variety of training and education requirements for these entry jobs; some firms require high school, some require college and many require something in between such as special training or a post-high school training course.

Sales Workers

Nationally, an increased number of new products and an expanding population caused a growth in the number of sales workers of almost 25% between 1947 and 1965. This trend is projected to continue into the 1970's. Real estate, insurance, wholesale trade and manufacturing representatives have accounted for most of the employment needs. Retail trade accounts for a small percentage.

The number of sales workers has declined in Maine since 1960 and the projected need for sales workers is the smallest of any occupational group except laborers. The largest number will be needed in wholesale and retail trade and finance, insurance and real estate, with a few persons needed in manufacturing. Replacements make up a sizable proportion of sales workers needed in most industries. The proportions of entry jobs in both

TABLE III-13

New and Replacement Sales Workers Needed to 1975, by Industry

SIC	Industry	Additional Workers Needed	Replacements Needed	Total Needs
20	Food	71	106	177
37	Transportation Equipment	22	8	30
31	Leather	1	51	52
26	Paper	28	22	50
23	Apparel	37	6	43
	Other Manufacturing	–12	123	111
	Total Manufacturing			463
52-59	Retail Trade	–8	2435	2427
50	Wholesale Trade	283	507	790
60-67	Finance, Insurance and Real Estate	92	278	370
70-89	Miscellaneous Services	43	199	242
91-93	Public Administration	24	116	142
15-17	Contract Construction	50	35	85
	Other Non-Manufacturing	22	51	73
	Total Non-Manufacturing			4129
	Total Manufacturing			463
	Grand Total			4592

manufacturing and non-manufacturing are very high as is seen in Table III-15. The vast majority of firms require no special education or training beyond a high school degree. In manufacturing 9% of the jobs require some kind of post-high school technical training and 12% require a college degree; another 5% require some kind of special training course. (See Table III-15.) In non-manufacturing only 13% require any kind of formal education beyond high school and another 4% require some kind of short training course or special courses in high school. (See Table III-16.)

Firms that require training or education are more likely to be found in contract construction, transportation & public utilities, wholesale and retail trade and finance, insurance, and real estate.

TABLE III-14

Entry Jobs — Sales Workers and the Proportion of Sales Workers in Each Entry Job, by Industry

	Manufacturing Industries				
	Food (20)	Transportation Equipment (37)	Leather (31)	Paper (26)	Apparel (23)
Salesworkers	48%	74%	85%	65%	100%
Other					
Total number of sales workers shown in parentheses	(507)	(36)	(246)	(106)	(35)

	Non-Manufacturing Industries						
	Contract Construction (15-17)	Utilities and Sanitary (41-49)	Wholesale (Trade) (50)	Retail (Trade) (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
Salesworkers	92%	78%	73%	100%	100%	73%	22%
Other							
Total number of sales workers shown in parentheses	(166)	(230)	(2407)	(11596)	(1328)	(538)	(554)

Table III-15

Education and Training Requirements for Sales Workers Entry Jobs in Manufacturing

Training	Total	No Requirements			Years of School						
			4-8	9-11	12	12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
None	79	17	2	2	51	3	2	—	2	—	—
None—will train	27	5	—	—	10	2	1	—	9	—	—
Experience	110	22	3	—	68	4	4	—	9	—	—
Apprenticeship	—	—	—	—	—	—	—	—	—	—	—
Short Training Course	2	—	—	—	2	—	—	—	—	—	—
Specialized H.S. Course	4	—	—	—	4	—	—	—	—	—	—
Special Courses	3	—	—	—	3	—	—	—	—	—	—
Technical Institute	11	—	1	—	3	3	2	—	1	1	—
Specialized College	10	1	—	—	—	—	—	—	9	—	—
Mixed	—	—	—	—	—	—	—	—	—	—	—
Total	246	45	6	2	141	12	9	—	30	1	—

Table III-16

Education and Training Requirements for Sales Workers in Non-Manufacturing

Training	Total	No Requirements			Years of School						
			4-8	9-11	12	12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
None	753	—	28	34	639	21	12	3	16	—	—
None—will train	302	68	13	10	178	10	5	—	18	—	—
Experience	489	88	21	9	304	21	13	1	30	—	2
Apprenticeship	1	—	—	1	—	—	—	—	—	—	—
Short Training Course	39	4	—	—	28	4	1	—	2	—	—
Specialized H.S. Course	13	—	—	—	11	2	—	—	—	—	—
Special Courses	30	5	—	—	22	—	3	—	—	—	—
Technical Institute	28	—	—	—	7	6	10	1	4	—	—
Specialized College	32	—	—	—	2	2	—	—	28	—	—
Mixed	2	—	—	—	—	—	—	—	2	—	—
Total	1689	165	62	54	1191	66	44	5	100	—	2

Clerical and Kindred Workers

National trends. More than half of clerical and kindred workers are found in manufacturing, wholesale and retail trade, and public administration. The increase in employment requirements has been steady between 1947 and 1965 resulting from the expansion of the economy and the rapid increase in the amount of business communications conducted through mail and telephone systems, an increase likely to continue. In retail business the trend of transferring to clerical personnel operations formerly executed by sales workers will contribute to rising needs. Automatic record processing techniques will tend to limit growth somewhat.

The needs for bookkeepers over 1965 employment are expected to rise about 20%. Use of electronic data processing machinery will limit growth somewhat, but many smaller firms will not move to total automation. Use of automatic data processing machinery will create increased need for workers to write input and summary reports of the resulting increased amount of data.

The need for office machine operators is expected to double nationally between 1965 and 1975 due largely to continued growing requirements for record keeping. Most growth will be found in manufacturing and insurance and banking. Increased use of computers and copy machines will require rapid increase in need for operators.

The largest single group in the category, stenographers, secretaries, and typists, is expected to increase in size by one-third between 1965 and 1975.

Technological developments are not seen as a limiting factor in employment requirements for clerical and kindred workers although they will result in increased output per worker, especially for the more routine operations. The expanding volume of paper work associated with continued economic expansion will require more workers in this group.

Maine Trends. There will be over 11,000 additional clerical workers needed in Maine by 1975 (Tables III-17 and III-18). The largest needs will be in finance, insurance and real state, government, and wholesale and retail trade. Less than 20% of the needs are in manufacturing. Most industries, either manufacturing or non-manufacturing, have a large proportion of their clerical jobs as entry jobs. (Table III-19).

Tables III-20 and III-21 indicate education and training requirements for manufacturing and non-manufacturing respectively. Almost 20% of the clerical jobs in manufacturing require formal education beyond high school; another 44% require a specialized high school course or special courses in high school along with a high school degree. In non-manufacturing 13% of the jobs require formal education beyond high school and 34% require special programs or courses in high school.

Appendix B contains the hiring requirements for specific entry jobs. The requirements apparently vary more with the firm than with the particular job since no pattern is apparent.

TABLE III-17

New and Replacement Clerical Workers Needed to 1975, by Industry

SIC	Industry	Additional Workers Needed	Replacements Needed	Total Needs
26	Paper	105	308	413
37	Transportation Equipment	184	73	257
23	Apparel	135	28	163
36	Electrical Machinery	74	43	117
35	Non-electrical Machinery	43	61	104
20	Food	120	230	350
60-67	Finance, Insurance, Real Estate	721	1606	2327
52-59	Retail Trade	663	1429	2092
91-93	Public Administration	214	1635	1849
50	Wholesale Trade	470	70[illegible]	1176
70-89	Miscellaneous Services	581	551	1132
48	Communications	–282	462	180
49	Utilities and Sanitary	–85	195	110

Table III-18

Total Needs to 1975 for Clerical & Kindred Wo

	Manufacturing Industries								
	Paper (26)	Transportation Equipment (37)	Apparel (23)	Electrical Machinery (36)	Non-electrical Machinery (35)	Food (20)	Other Mfg.	Contract Construction (15-17)	Truckin and Ware- housin (42)
Total needs to 1975	413	254	163	117	104	350	577	420	188
Bookkeepers		13	8	9	12	61	59	123	40
Cashiers						6			
Shipping & Receiving Clerks	123		21	2	3	49	75		28
Office Machine Operators	102	13	21	9	6	15	22		8
Secretaries, Typists, Stenos.	55	51	39	37	29	23	103	98	18
Telephone Operators	4	5			2	4	11		
Other Clerical and Kindred	132	172	75	57	51	191	307	194	94

Table III-19

Entry Jobs — Clerical Workers and the Proportion of Cl

	Manufacturing Industries						
	Paper (26)	Transportation Equipment (37)	Apparel (23)	Electrical Machinery (36)	Non-electrical Machinery (35)	Food (20)	Contract Construction (15-17)
Secretaries, Stenographers, Typists	12%	27%	6%	22%	14%	18%	17%
General Office, Clerical	51	55	71	34	53	33	32
Bookkeepers	2	7	7	3	13	20	36
Office Machine Operators		4			4	9	
Shipping & Receiving Clerks				3	3		
Computer Operators			3				
Cashiers & Tellers							1
Dispatchers							
Meter Readers							
Stockclerks							
Parts Men							
Credit Adjusters, Collectors							
Accounting Aides							
Postal Workers							
Claims Service Representative							
Inspectors							
Other	3	3	12	10	3	14	4
Total	68%	96%	99%	72%	90%	95%	99%
Total number of clerical workers shown in parentheses	(1289)	(310)	(139)	(181)	(257)	(684)	(772)

TABLE III-18

to 1975 for Clerical & Kindred Workers, by Specific Occupations

		Non-Manufacturing Industries											
Other Mfg.	Contract Construction (15-17)	Trucking and Warehousing (42)	Other Transportation (41, 44-47)	Communications (48)	Utilities and Sanitary (49)	Wholesale (Trade) (50)	Retail (Trade) (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)	Total Mfg.	Total Non-Mfg.	Gra Tot
577	420	188	42	180	110	1176	2092	2327	1132	1849	1977	9516	114
59	123	40	3	5	12	259	898	349	121	37	162	1847	20
			13	5	7	12	147	70	92	9	6	355	3
75		28				106	84				273	218	4
22		8			4	47		93	11	18	188	181	3
103	98	18	5	16	19	164	209	652	507	370	337	2058	23
11			1	99	1	12	21	23	25	18	26	200	2
307	194	94	19	54	68	576	732	1140	375	1368	985	4650	56

TABLE III-19

cal Workers and the Proportion of Clerical Workers in Each Entry Job, by Industry

		Non-Manufacturing Industries									
on-electrical achinery (35)	Food (20)	Contract Construction (15-17)	Other Transportation (41, 44-47)	Trucking and Warehousing (42)	Communications (48)	Utilities and Sanitary (49)	Wholesale (Trade) (50)	Retail (Trade) (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
14%	18%	17%	20%	25%	6%	11%	15%	7%	10%	30%	12%
53	33	32	11	29	43	32	36	32	45	21	21
13	20	36	20	20	2	4	15	21	10	13	2
4	9					6	2		2	3	1
3											
					1						
		1	1	1				28	24	9	
			18								
						7					
								3			
										1	
										4	
										1	
											23
											1
											2
3	14	4	9	17	48	5	12	6	3	6	2
90%	95%	99%	78%	92%	100%	65%	80%	98%	95%	88%	64%
(257)	(684)	(772)	(240)	(490)	(1942)	(674)	(2963)	(6006)	(6767)	(2430)	(6869)

Table III-20

Education and Training Requirements for Office and Clerical Workers Entry Jobs in Manufacturing

Training	Total	No Requirements	4-8	9-11	12	12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
				Years of School							
None	220	26	5	5	167	4	11	—	2	—	—
None—will train	46	10	2	—	31	3	—	—	—	—	—
Experience	170	13	2	3	130	8	12	1	1	—	—
Apprenticeship	—	—	—	—	—	—	—	—	—	—	—
Short Training Course	25	—	—	—	17	8	—	—	—	—	—
Specialized H.S. Course	298	—	—	1	288	8	1	—	—	—	—
Special Courses	137	5	—	—	124	5	3	—	—	—	—
Technical Institute	150	2	—	—	26	63	56	1	2	—	—
Specialized College	9	—	—	—	—	—	1	—	7	1	—
Mixed	2	—	—	—	1	—	1	—	—	—	—
Total	1057	56	9	9	784	99	85	2	12	1	—

Table III-21

Education and Training Requirements for Office and Clerical Workers Entry Jobs for All Non-Manufacturing

Training	Total	No Requirements	4-8	9-11	12	12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
				Years of School							
None	1111	—	14	38	917	50	71	7	14	—	—
None—will train	319	39	16	4	233	10	9	—	8	—	—
Experience	756	53	3	10	562	59	52	2	13	2	—
Apprenticeship	—	—	—	—	—	—	—	—	—	—	—
Short Training Course	43	9	—	—	26	4	4	—	—	—	—
Specialized H.S. Course	779	1	—	1	748	20	9	—	—	—	—
Special Courses	614	28	2	1	541	24	16	—	2	—	—
Technical Institute	556	2	—	—	132	133	270	13	6	—	—
Specialized College	36	—	—	—	2	—	—	2	30	2	—
Mixed	6	—	—	—	2	2	1	—	1	—	—
Total	4220	132	35	54	3163	302	432	24	74	4	—

Craftsmen

National collar occu employmen increase of individual what inclu though this occupations

The 197 over those ment needs category as equipment ployment n increase mo expected t limited by t

Maine Tr there will be foremen, an in Maine. S persons who some other because of t in total emp

The total foremen (se in non-man

Craftsmen

National Trends. Nationally, this is the only blue-collar occupational group to increase as fast as total employment between 1947 and 1965. The fairly rapid increase of that period included wide variation among individual occupations. Occupations declining somewhat included painters, bakers, and carpenters, although this last group remains the largest among skilled occupations.

The 1975 levels are expected to be about 25% over those of 1965. Mechanics and repairmen employment needs will grow more rapidly than needs for the category as a whole, reflecting increased use of complex equipment industry and need for its maintenance. Employment needs in the building trades are expected to increase more slowly. The machinery occupations are expected to see a rise in needs, though somewhat limited by the use of numerically controlled equipment.

Maine Trends. In Maine, as shown in Table III-22, there will be a substantial need for additional craftsmen, foremen, and kindred workers in almost every industry in Maine. Some of these needs will be replacements for persons who have died, retired, or been promoted to some other occupational group. Others will be needed because of technological change and because of growth in total employment.

The total need is about 5,900 new craftsmen and foremen (see Table III-23) in manufacturing and 5,200 in non-manufacturing. Twenty-five percent of the needs in manufacturing are in transportation equipment and 28% in paper; in non-manufacturing industries 40% of the needs are in contract construction and 24% in retail trade.

There will be a variety of workers needed. The largest needs are for mechanics and repairmen, then foremen, carpenters, machinists, plumbers, electricians, and millwrights. However, one must be careful in translating total needs into requirements for particular kinds of workers because in some industries there are relatively few entry jobs in the craftsman occupational group, especially in those manufacturing industries with the largest probable needs (paper, transportation equipment and leather). In other manufacturing industries, such as food, non-electrical machinery, fabricated metals, and lumber and wood and in virtually all the non-manufacturing industries, the majority of the craftsmen jobs are entry jobs.

Tables III-25 and III-26 contain hiring requirements for manufacturing and non-manufacturing respectively. There are a wide variety of educational and training requirements. For example in non-manufacturing about 20% of the jobs require post-high school training of some kind or another and 25% of the jobs simply require experience with no other educational training requirements. The same general picture is also true for manufacturing. Following are brief comments about specific occupations.

TABLE III-22

New and Replacement Craftsmen Workers Needed to 1975, by Industry

SIC	Industry	Additional Workers Needed	Replacements Needed	Total Needs
37	Transportation Equipment	1466	363	1829
26	Paper	1082	613	1695
31	Leather	164	222	386
24-25	Lumber and Furniture	–18	286	268
35	Non-electrical Machinery	42	142	231
36	Electrical Machinery	147	37	184
23	Apparel	93	13	106
34	Fabricated Metals	12	90	102
22	Textiles	–113	194	81
30	Rubber and Plastic	49	29	78
20	Food	209	154	363
15-17	Contract Construction	976	1143	2119
52-59	Retail Trade	586	660	1246
50	Wholesale Trade	549	203	752
91-93	Public Administration	189	272	461
70-89	Miscellaneous Services	71	187	258
49	Utilities and Sanitary	–40	194	154
48	Communications	–2	135	133

Mechanics and Repairmen. Nationally this forms one of the fastest growing occupational groups in the total labor force. Automotive mechanics and repairmen made up almost one-third of this group in 1966. Other large groups are appliance servicemen, industrial machinery repairmen, television and radio service technicians and aircraft mechanics. Related occupations are electricians, telephone repairmen, millwrights and watch repairmen. Altogether these groups accounted for about 30% of all skilled workers. Training is generally provided by on the job training of 3 to 4 years, and apprenticeship programs. MDTA programs also provide a substantial number of workers; the automotive mechanic training program is one of the largest programs.

Needs for mechanics and repairmen are spread throughout the Maine economy. The industries that list mechanics and repairmen as an entry job and have a substanial need projected for 1975 are food, leather, contract construction, retail trade, transportation, miscellaneous services, and government. A number of the firms in these industries needing substantial numbers of mechanics and repairmen require some kind of post-high school training (see Appendix B). Generally speaking though, most firms simply require a high school degree or less with experience and some do not even require the experience. Firms in retail trade have the highest standards, 49% require apprenticeship or short training course and an additional 20% require technical institute or other post-high school training. Hiring requirements for appliance servicemen, often found in appliance stores of under 10 employees, are largely high school plus experience or high school plus a short training course or apprenticeship.

Machinists. Nationally, over four-fifths of all machinists are found in manufacturing with large numbers in non-electrical machinery, transportation equipment, fabricated metal products, electrical machinery and primary metals. This occupational group has experienced almost complete stability despite increased output in the machine industry, due largely to technological developments such as numerically controlled machinery. A slight increase in employment needs is expected by 1975. Apprenticeship is the usual method of acquiring proficiency in this trade.

In Maine the two industries requiring significant numbers of machinists are transportation equipment and non-electrical machinery. Only non-electrical machinery firms list machinists as an entry job, more likely the larger firms. High school plus some experience is the chief requirement, with high school alone the next most commonly requested; fifteen percent of the firms required post-high school training or education.

For *metal working craftsmen* in Maine's fabricated metals industry requirements are spread equally between high school and no experience—will train, high school and experience, and technical institute or other post-high school training. They form two-thirds of entry craftsmen in fabricated metals, and about two-fifths of the entry craftsmen in the transportation equipment industry, which hires 29% of all its entry level occupations in the craftsmen category.

Foremen. Some foremen are needed by almost every industry in Maine. In general the job of foreman is filled by promotion from within the company. However, some industries do list foreman as an entry job, including transportation equipment, leather, apparel, lumber and wood, food, contract construction, and government.

In the leather and apparel industry, entry foremen are usually found in firms of over 100 employees. Most firms require simply experience for the foreman job. Contract construction and retail trade are the only industries where a substantial number of firms require formal training programs.

The hiring requirements for *millwrights* in Maine, found chiefly in the paper and lumber and wood industries, are most commonly high school plus some experience. An occasional firm requires more formal training or education.

Carpenters. Although nationally employment in this largest single skilled worker group declined somewhat between 1950 and 1965 (due in part to use of prefabricated materials) demand is projected to rise slightly by 1975 due to increased construction activity. Training is most generally through a formal apprenticeship program of 3 to 4 years.

The only industries in Maine to show a substantial need for carpenters are transportation equipment and construction. Firms in both industries list carpenters as an entry job and they form the largest single group of entry level craftsmen in the construction industry. The great majority of firms who hire carpenters require experience but no formal training. Only a few construction firms require post-high school training of some kind.

Electricians. Nationally more than 40% of this occupational group is employed in the construction industry. Having increased about one-fifth between 1950 and 1965, employment is expected to grow by about 15% by 1975. The usual training is through 4 year apprenticeship programs.

In Maine the job of electrician is one for which employment needs in 1975 will be fairly substantial relative to other craftsmen, with the greatest need in transportation equipment, paper, and construction. Transportation equipment firms do not list electricians as an

TABLE III-23

Total Needs to 1975 for Craftsmen, Foremen & Kindred Workers, by Specific Occupations

	Manufacturing Industries											
	Paper (26)	Leather (31)	Non-electrical Machinery (35)	Electrical Machinery (36)	Apparel (23)	Fabricated Metals (34)	Textiles (22)	Rubber & Plastics (30)	Lumber & Wood (24, 25)	Transportation Equipment (37)	Food (20)	Other Mfg.
Total Needs to 1975	1695	386	231	184	106	102	81	78	268	1829	363	33
Blacksmiths, Forgemen, Hammermen			2			5		1		18		
Boilermakers						1				18	1	2
Cabinetmakers				9		2			8	18		2
Carpenters	34	4			2	2	1	7	16	311	11	1
Cranemen, Hoistmen, Construction Machine Operators	68			2		5		2	13	18	1	2
Electricians	119	4	5	9			2			183	6	3
Foremen, n.e.c.	424	243	30	50	58	16	33	30	70	91	111	18
Machinists & Jobsetters	68	4	104	40	14	16	2	4	24	274	5	5
Mechanics & Repairmen	373	104	53	44	17	24	21	15	40	183	132	16
Millwrights	220					1	1		11			
Plumbers & Pipefitters	153		2			1	1	1		91	1	1
Printing Craftsmen	17				2	1					8	-34
Stationary Engineers			5	11	2	2			3	18		2
Toolmakers, Diemakers & Setters			9	7		6		2		18		1
Other Craftsmen, Foremen & Kindred Workers	203	27	14	13	12	18	20	14	75	603	86	16

Table III-23 (Continued)

Total Needs to 1975 for Craftsmen, Foremen & Kindred Workers, by Specific Occupations

	Non-Manufacturing Industries												
	Contract Construction (15-17)	Trucking and Warehousing (42)	Other Transportation (41, 44-47)	Communications (48)	Utilities and Sanitary (49)	Wholesale (Trade) (50)	Retail (Trade) (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)	Total Mfg.	Total Non-Mfg.	Grand Total
Total Needs to 1975	2119	88	4	133	154	752	1246	11	258	461	5355	5226	10582
Blacksmiths, Forgemen, Hammermen									1		26	1	27
Boilermakers											22		22
Cabinetmakers							25		1		39	26	65
Carpenters	678	2	1			7	62	3	14	18	389	785	1174
Cranemen, Hoistmen, Construction Machine Operators	42	2	1			22					111	67	178
Electricians	127				8	7			2	23	331	167	498
Foremen, n.e.c.*	170	21	1	7	14	271	50	1	19	55	1174	608	1782
Machinists & Job-setters						15				5	560	20	581
Mechanics & Repairmen	212	58	1	9	52	369	835	4	154	226	1022	1920	2942
Millwrights											268		268
Plumbers & Pipefitters	212				2		25		1	14	251	254	505
Printing Craftsmen									4	5	–6	9	3
Stationary Engineers				1	14	22	12	1		23	43	73	116
Toolmakers, Diemakers & Setters											43		43
Other Craftsmen, Foremen & Kindred Workers	678	5		116	65	37	237	2	62	92	1101	1294	2395

Table III-24

Entry Jobs — Craftsmen & Kindred Workers and Production of These Workers in Each Entry Job, by Industry

	Manufacturing Industries											
	Transportation Equipment (37)	Paper (26)	Leather (31)	Non-electrical Machinery (35)	Electrical Machinery (36)	Apparel (23)	Fabricated Metals (34)	Textiles (22)	Rubber & Plastics (30)	Lumber and Wood (24, 25)		Food (20)
Construction Craftsmen	%	%	%	%	%	%	%	4%	%	%	%	%
Foremen	1		8	3		23	3	3	8	11	15	13
Electricians		2			3		3	1		1	1	4
Mechanics, Repairmen	2		2	14	3	15		11	8	8	1	20
Millwright		3						1		4	1	
Machinists		6	6	60	34	10	8			9	12	7
Carpenters	3		2			3	4			3	8	1
Tailors & Tailoresses						9						
Maintenance Men						6						
Lumber Graders										4		
Machine Operators							1			12		5
Designers & Pattern Makers			1				2					
Metal Working Craftsmen	12						40					
Inspectors					33							
Sailmakers						4						
Masons												
Cranemen, Hoistmen, Construction Machine Operators												
Painters												
Plumbers & Pipefitters												2
Linemen, Cablemen												
Bakers, Chefs, & Frosters												14
Bodymen												
Oilburner Servicemen												
Upholsterers & Carpet Layers												
Teletype Operators & Mech.												
T.V. Repairmen												
Projectionists												
Other	11	7	3	6	1	10	4	1	3	18	24	6
Total	29%	18%	22%	83%	74%	80%	65%	21%	19%	70%	62%	73%
Total number of Craftsmen & Kindred workers shown in parentheses	(2591)	(4362)	(1598)	(1014)	(262)	(91)	(640)	(1398)	(207)	(2038)		(1102)

	Non-Manufacturing Industries									
	Contract Construction (15-17)	Other Transportation (41, 44-47)	Trucking and Warehousing (42)	Communications (48)	Utilities and Sanitary (49)	Wholesale (Trade) (50)	Retail (Trade) (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
Construction Craftsmen	%	1%	%	%	%	%	%	%	2%	%
Foremen	5	7	10		1	4	4	23	2	3
Electricians	9			1	5	1	1		2	2
Mechanics, Repairmen	1	48	69	5		24	62	14	49	12
Millwright										
Machinists			1			63			1	
Carpenters	29	8					2	23	1	4
Tailors & Tailoresses							1			
Maintenance Men					1					2
Lumber Graders										
Machine Operators										
Designers & Pattern Makers										
Metal Working Craftsmen	2									
Inspectors								20	3	
Sailmakers		2								
Masons	5									1
Cranemen, Hoistmen, Construction Machine Operators	9	2	5			1				18
Painters	7						1			2
Plumbers & Pipefitters	7					1	1	3		1
Linemen, Cablemen				3	11					
Bakers, Chefs, & Frosters							3		1	
Bodymen							6		11	
Oilburner Servicemen							8			
Upholsterers & Carpet Layers							1		5	
Teletype Operators & Mech.									2	
T.V. Repairmen									1	
Projectionists									3	
Other	10	1	4	83	5	5	6	3	6	11
Total	84%	68%	89%	93%	23%	100%	96%	86%	90%	58%
Total number of Craftsmen & Kindred workers shown in parentheses	(8166)	(231)	(278)	(966)	(1194)	(1451)	(4712)	(46)	(1149)	(1939)

Table III-25

Education and Training Requirements for Craftsmen Entry Jobs in Manufacturing

						Years of School					
Training	Total	No Requirements	4-8	9-11	12	12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
None	152	89	10	5	46	1	1	—	—	—	—
None—will train	113	47	6	1	55	3	1	—	—	—	—
Experience	444	172	52	8	194	9	7	—	1	1	—
Apprenticeship	29	8	1	—	18	2	—	—	—	—	—
Short Training Course	26	7	—	—	15	—	4	—	—	—	—
Specialized H.S. Course	—	—	—	—	—	—	—	—	—	—	—
Special Courses	14	2	—	1	11	—	—	—	—	—	—
Technical Institute	82	6	—	4	26	16	29	1	—	—	—
Specialized College	1	—	—	—	—	—	—	—	1	—	—
Mixed	11	5	—	—	3	—	2	1	—	—	—
Total	872	336	69	19	368	31	44	2	2	1	—

Table III-26

Education and Training Requirements for Craftsmen Entry Jobs in Non-Manufacturing

						Years of School					
Training	Total	No Requirements	4-8	9-11	12	12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
None	216	—	21	13	149	17	11	4	1	—	—
None—will train	269	94	23	8	136	6	2	—	—	—	—
Experience	1151	544	114	30	411	34	13	3	2	—	—
Apprenticeship	37	17	4	1	15	—	—	—	—	—	—
Short Training Course	131	31	4	5	70	19	2	—	—	—	—
Specialized H.S. Course	1	—	—	—	1	—	—	—	—	—	—
Special Courses	31	2	—	—	29	—	—	—	—	—	—
Technical Institute	244	35	3	—	85	37	78	5	1	—	—
Specialized College	8	—	—	—	—	—	—	2	6	—	—
Mixed	23	7	1	4	4	4	3	—	—	—	—
Total	2111	730	170	61	900	117	109	14	10	—	—

entry job. Hiring requirements are generally quite high; over half of the firms in construction who hire electricians require formal training of some kind.

Plumbers and Pipefitters. Nationally, this group has grown by 15% between 1950 and 1965—and will probably grow by about one-fourth by 1975, due in part to anticipated growth in construction, and increases in population and income. Growth will be limited somewhat by technological developments such as prefabricated equipment and use of light weight plastic materials.

In Maine, plumbers and pipefitters will form 4% of the total needs for craftsmen in 1975 with most of the needs in transportation equipment, paper and contract construction. It is an entry level job only in the contract construction industry. Over half of the firms require some kind of training program; most of the rest prefer experience.

Operatives

Nationally needs for operatives are projected to be about 12% over 1965 figures, even though employment requirements have fluctuated since World War II. The increased demand is accounted for in part by rising production. Operatives represent the largest group of blue collar workers. Technological improvements will limit employment growth most in the manufacturing sector. Training for most semi-skilled workers is acquired on the job and is not of long duration.

There will be a need for over 13,000 additional operatives in Maine by 1975, the largest number for any occupational group. Over 75% of the need for operatives will be in manufacturing (Table III-27). The bulk of total needs lies in replacements for leather, paper, and retail trade, and in additional workers in apparel, electrical machinery, transportation equipment, and contract construction. A combination of replacements and additional workers will be needed in non-electrical machinery, rubber and plastics, trucking and wholesale trade.

Most operative jobs are entry level (Table III-28) and very few require any special education or training (Table III-30).

In manufacturing, less than 30% of the operative entry jobs require a high school degree; 23% require experience. Virtually none of the jobs in manufacturing (less than 1%) require any kind of post-high school training, and only 4% of the jobs require any special training whatsoever (usually special courses in high school or special short training courses). Two of the jobs which do require such training are welders (non-electrical machinery) and cutters (apparel). (See Appendix B.)

Requirements are somewhat higher in non-manufacturing: just over 50% of the operative jobs require a high school degree; 30% require experience. Only 2% of operative jobs require any post-high school training and about 4% require some kind of training or special courses. One particular entry job that does often require special training is apprentices in contract construction.

TABLE III-27

New and Replacement Operative Workers Needed to 1975, by Industry

SIC	Industry	Additional Workers Needed	Replacements Needed	Total Needs
31	Leather	105	3133	3238
23	Apparel	2702	392	3094
36	Electrical Machinery	1607	464	2071
37	Transportation Equipment	1246	171	1417
20	Food	576	694	1270
26	Paper	291	895	1186
30	Rubber and Plastic	245	246	491
35	Non-electrical Machinery	127	108	235
34	Fabricated Metals	10	104	114
50	Wholesale Trade	601	572	1173
52-59	Retail Trade	336	582	918
15-17	Contract Construction	610	257	867
70-89	Miscellaneous Services	88	302	390
91-93	Public Administration	–64	213	149
49	Utilities and Sanitary	–45	70	25
60-67	Finance, Insurance, Real Estate	6	8	14
48	Communications	–10	12	2

TABLE III-28

Total Needs to 1975 for Operatives & Kindred Workers, by Specific Occupations

Manufacturing Industries

Occupations	Leather (31)	Apparel (23)	Electrical Machinery (36)	Transportation Equipment (37)	Paper (26)	Rubber & Plastic (30)	Non-electrical Machinery (35)	Fabricated Metal (34)	Chemicals (28)	Food (20)	Other Mfg.
Total Needs to 1975	3238	3094	2071	978	1186	491	235	62	109	1270	239
Assemblers			601	20			21	2			21
Furnacemen, Smeltermen, Checkers				20			2	1			2
Truck Drivers, Deliverymen	32	60	41	108	59	20	5	4	16	355	102
Welders & Flamecutters			21	362	36	10	33	8	4		2
Sewers & Stitchers, mfg.	583	2001									–23
Other Operatives & Kindred Workers	2623	1031	1408	479	1091	462	172	49	88	906	139

Total Needs to 1975 for Operatives & Kindred Workers, by Specific Occupations

Non-Manufacturing Industries

Occupations	Contract Construction (15-17)	Utilities and Sanitary (49)	Wholesale (Trade) (50)	Retail (Trade) (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Adminis- (91-93)	Total Non-Mfg.	Total Mfg.	Grand Total
Total Needs to 1975	867	742	1297	793	30	365	149	4243	12778	17031
Assemblers									661	661
Furnacemen, Smeltermen, Checkers									25	25
Truck Drivers, Deliverymen	546	626	739	317	12	56	89	2385	748	3133
Welders & Flamecutters	69		13			12	8	102	476	578
Sewers & Stitchers, mfg.									2561	2561
Other Operatives & Kindred Workers	251	116	545	476	18	298	52	1756	8310	10066

TABLE III-29

Entry Jobs — Operative Workers, and the Proportion of Operative Workers in Each Entry Job, by Industry

	Manufacturing Industries									
	Food (20)	Leather (31)	Apparel (23)	Electrical Machinery (36)	Transportation Equipment (37)	Paper (26)	Rubber & Plastic (30)	Non-electrical Machinery (35)	Fabricated Metals (34)	Chemicals (28)
Welders & Flamecutters	%	%	%	%	%	%	%	1%	3%	%
Sewers & Stitchers, mfg.		1	2							
Apprentices										
Switchboard operators										
Other	98	83	97	97	25	74	98	93	50	96
Total	98%	84%	99%	97%	25%	74%	98%	94%	53%	96%
Total number of operative workers shown in parentheses	(6061)	(22467)	(3334)	(3311)	(1234)	(6375)	(757)	(771)	(741)	(518)

	Non-Manufacturing Industries									
	Contract Construction (15-17)	Other Transportation (41, 44-47)	Trucking and Warehousing (42)	Communications (48)	Utilities and Sanitary (49)	Wholesale (Trade) (50)	Retail (Trade) (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
Welders & Flamecutters	%	%	%	%	%	%	18%	%	%	%
Sewers & Stitchers, mfg.										
Apprentices	18			5	10	1	3	56	1	
Switchboard operators										3
Other	65	97	97	70	61	90	79	44	95	53
Total	84%	97%	97%	75%	71%	91%	100%	100%	96%	56%
Total number of operative workers shown in parentheses	(1838)	(890)	(2682)	(82)	(413)	(4089)	(4158)	(58)	(2125)	(1523)

Table III-30

Education and Training Requirements for Operative Entry Jobs in Manufacturing

Training	Total	No Requirements	4-8	9-11	12	Years of School 12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
None	323	202	39	11	69	—	1	—	—	1	—
None—will train	242	118	34	14	76	—	—	—	—	—	—
Experience	189	93	33	8	53	—	2	—	—	—	—
Apprenticeship	28	10	2	1	15	—	—	—	—	—	—
Short Training Course	3	1	—	—	2	—	—	—	—	—	—
Specialized H.S. Course	1	—	—	—	1	—	—	—	—	—	—
Special Courses	12	2	1	—	9	—	—	—	—	—	—
Technical Institute	12	—	—	1	8	—	2	—	1	—	—
Specialized College	—	—	—	—	—	—	—	—	—	—	—
Mixed	5	4	—	—	1	—	—	—	—	—	—
Total	815	430	109	35	234	—	5	—	1	1	—

Table III-31

Education and Training Requirements for Operative Entry Jobs in Non-Manufacturing

Training	Total	No Requirements	4-8	9-11	12	Years of School 12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
None	498	—	102	42	348	1	2	—	1	2	—
None—will train	256	99	27	9	117	4	—	—	—	—	—
Experience	541	237	74	26	199	4	1	—	—	—	—
Apprenticeship	122	49	7	8	56	2	—	—	—	—	—
Short Training Course	33	11	3	—	16	1	2	—	—	—	—
Specialized H.S. Course	2	—	—	—	2	—	—	—	—	—	—
Special Courses	16	4	2	—	10	—	—	—	—	—	—
Technical Institute	25	3	—	—	10	7	5	—	—	—	—
Specialized College	—	—	—	—	—	—	—	—	—	—	—
Mixed	—	—	—	—	—	—	—	—	—	—	—
Total	1493	403	215	85	758	19	10	—	1	2	—

Laborers

Manufacturing industries nationally employ about one-third of all non-farm laborers. Little change in employment requirements is anticipated in the years to 1975 nationally, due to increasing output per worker from continuing substitution of mechanical equipment (such as forklift trucks, conveyor belts, and automated processing systems) for manual labor, which will offset rising demand.

In Maine there will be approximately 1800 laborers needed, the smallest growth of any occupational group. The only manufacturing industries with any need for additional laborers will be leather (for replacements) and transportation equipment and electrical machinery (for new workers). Manufacturing as a whole will require fewer laborers in 1975 than is required now (Table III-32). The needs in non-manufacturing are largely in contract construction and wholesale and retail trade. This worker group is generally an entry level one (Table III-33). Educational and training requirements (Tables III-34 and III-35) vary from none to a high school education, particularly in industries where the main entry level is among laborers (e.g., many large paper companies). Most laborer jobs have no training or education requirements. About 1% of jobs in either manufacturing or in non-manufacturing require special training, either in high school or post-high school. One firm in food and several firms in construction, retail trade, and the service industries have post-high school training as a minimum requirement for laborer jobs.

TABLE III-32

New and Replacement Laborers Needed to 1975, by Industry

SIC	Industry	Additional Workers Needed	Replacements Needed	Total Needs
20	Food	288	348	636
31	Leather	–7	412	405
26	Paper	–576	317	–259
37	Transportation Equipment	108	29	137
36	Electrical Machinery	126	30	96
23	Apparel	76	9	67
	Other Manufacturing	–1605	972	–633
	Total Manufacturing			449
70-89	Miscellaneous Services	143	119	262
50	Wholesale Trade	50	187	237
52-59	Retail Trade	–55	383	328
60-67	Finance, Insurance, Real Estate	9	9	18
91-93	Public Administration	–139	177	38
15-17	Contract Construction	143	276	419
	Other Non-Manufacturing	–150	110	–40
	Total Non-Manufacturing			1262
	Total Manufacturing			449
	Grand Total			1711

TABLE III-33

Entry Jobs — Laborers and the Proportion of Laborers in Each Entry Job, by Industry

Manufacturing Industries

	Food (20)	Transportation Equipment (37)	Electrical Machinery (36)	Leather (31)	Paper (26)	Apparel (23)
Total	98%	25%	100%	98%	100%	92%
Total number of laborers shown in parentheses	(3030)	(279)	(289)	(3934)	(3002)	(84)

Non-Manufacturing Industries

	Contract Construction (15-17)	Utilities and Sanitary (40-49)	Wholesale (Trade) (50)	Retail (Trade) (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
Total	93%	90%	90%	99%	76%	89%	86%
Total number of laborers shown in parentheses	(2629)	(1000)	(1790)	(3650)	(81)	(1135)	(1689)

Table III-34

Education and Training Requirements for Laborer Entry Jobs in Manufacturing

Training	Total	No Requirements	Years of School 4-8	9-11	12	12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
None	456	333	65	4	53	1	—	—	—	—	—
None—will train	73	35	17	4	16	1	—	—	—	—	—
Experience	12	7	2	1	2	—	—	—	—	—	—
Apprenticeship	—	—	—	—	—	—	—	—	—	—	—
Short Training Course	—	—	—	—	—	—	—	—	—	—	—
Specialized H.S. Course	1	—	—	—	1	—	—	—	—	—	—
Special Courses	5	2	—	—	3	—	—	—	—	—	—
Technical Institute	—	—	—	—	—	—	—	—	—	—	—
Specialized College	—	—	—	—	—	—	—	—	—	—	—
Mixed	—	—	—	—	—	—	—	—	—	—	—
Total	547	371	84	9	75	2	—	—	—	—	—

Table III-35

Education and Training Requirements for Laborer Entry Jobs in Non-Manufacturing

Training	Total	No Requirements	Years of School 4-8	9-11	12	12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
None	451	—	164	50	232	3	1	1	—	—	—
None—will train	141	77	26	6	30	2	—	—	—	—	—
Experience	86	42	8	5	31	—	—	—	—	—	—
Apprenticeship	—	—	—	—	—	—	—	—	—	—	—
Short Training Course	2	—	—	—	2	—	—	—	—	—	—
Specialized H.S. Course	—	—	—	—	—	—	—	—	—	—	—
Special Courses	4	—	—	—	4	—	—	—	—	—	—
Technical Institute	4	1	—	—	3	—	—	—	—	—	—
Specialized College	—	—	—	—	—	—	—	—	—	—	—
Mixed	—	—	—	—	—	—	—	—	—	—	—
Total	688	120	198	61	302	5	1	1	—	—	—

Service Workers

Growth in this occupational group stems largely from population growth, higher levels of business activity and an increase in disposable income. Nationally, protective service workers are due to grow most rapidly. In Maine, there will be about 4,500 additional service workers needed by 1975. Less than 10% of these workers will be required in manufacturing. (Table III-36).

The needs for service workers are spread through most industries since all need guards, watchmen, janitors, etc. Two industries, retail trade (largely waitresses) and government (largely guards and health workers) have the greatest need. The needs in retail trade are all for replacements; government needs are both for new workers and replacements. (Table III-37).

Almost all service worker jobs are entry jobs (Table III-38). Generally speaking, there are few educational or training requirements. In manufacturing no job requires any special training and only 15% of the jobs require even a high school degree (Table III-39). In non-manufacturing requirements are somewhat higher: 10% of the jobs require some kind of training either in high school or afterwards; almost half the jobs require a high school degree (Table III-40). The particular jobs that sometimes require special training are barber and beauticians, cooks, and bartenders.

TABLE III-36

New and Replacement Service Workers Needed to 1975, by Industry

SIC	Industry	Additional Workers Needed	Replacements Needed	Total Needs
24-25	Lumber and Furniture	–41	88	47
37	Transportation Equipment	47	23	70
26	Paper	25	73	98
31	Leather	1	52	53
23	Apparel	35	9	46
20	Food	14	84	98
91-93	Public Administration	954	1710	2664
52-59	Retail Trade	+98	1981	2079
70-89	Miscellaneous Services	68	1066	1134
60-67	Finance, Insurance, Real Estate	–68	132	64
50	Wholesale Trade	–7	19	12
48	Communications	–10	19	9
49	Utilities and Sanitary	–9	14	5

TABLE III-37

Total Needs to 1975 for Service Workers, by Specific Occupations

	Manufacturing Industries						
Occupations	Food (20)	Lumber & Wood (24, 25)	Transportation Equipment (37)	Paper (26)	Leather (31)	Apparel (23)	Other Mfg.
Total Needs to 1975	98	47	70	98	53	46	133
Charwomen, Janitors, Porters	26	5	17	60	4	25	39
Guards, Watchmen, Doorkeepers	25	12	38	31	15		68
Other Service Workers	46	31	17	7	33	21	25

	Non-Manufacturing Industries									
Occupations	Contract Construction (15-17)	Utilities and Sanitary (49)	Wholesale (Trade) (50)	Retail (Trade) (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)	Total Mfg.	Total Non-Mfg.	Grand Total
Total Needs to 1975	31	24	15	1758	186	598	2664	545	5276	5821
Charwomen, Janitors, Porters	11	14	8	422	128	203	213	176	999	1175
Guards, Watchmen, Doorkeepers	8	2	4	53	26	43	293	189	429	618
Other Service Workers	11	8	3	1283	32	351	2158	180	3846	4026

III-38

Entry Jobs — Service Workers and the Proportion of Service Workers in Each Entry Job, by Industry

	Manufacturing Industries					
	Food (20)	Transportation Equipment (37)	Leather (31)	Paper (26)	Lumber & Wood (24, 25)	Apparel (23)
Guards	11%	43%	35%	25%	49%	14%
Janitors	55	14	46	73	20	84
Waiters, Cooks, etc.	27		1	1	12	
Cleaners						
Kitchen Helpers						
Bakers						
Beauticians						
Mortuary Assistants						
Ushers, Doormen						
Laundry						
Ride Operators						
Golf Caddies, Green Keepers						
Nurses Aides, Maids						
Recreation						
Other	6	42	11	1	10	
Total	99%	99%	93%	100%	92%	98%
Total number of service workers shown in parentheses	(394)	(93)	(215)	(300)	(362)	(43)

	Non-Manufacturing Industries						
	Contract Construction (15-17)	Utilities and Sanitary (49)	Wholesale (Trade) (50)	Retail (Trade) (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
Guards	5%	25%	10%	%	8%	20%	42%
Janitors	13	21	71	5	77	20	6
Waiters, Cooks, etc.	5	5		74		1	4
Cleaners		11					
Kitchen Helpers				8		8	
Bakers						2	
Beauticians						19	
Mortuary Assistants						1	
Ushers, Doormen						2	
Laundry						1	
Ride Operators						3	
Golf Caddies, Green Keepers						5	
Nurses Aides, Maids							18
Recreation							1
Other	68	39	6	7	10	4	
Total	92%	100%	88%	94%	95%	86%	71%
Total number of service workers shown in parentheses	(55)	(180)	(77)	(8085)	(554)	(5301)	(6980)

Table III-39

Education and Training Requirements for Service Entry Jobs in Manufacturing

					Years of School						
Training	Total	No Requirements	4-8	9-11	12	12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
None	310	209	48	10	43	—	—	—	—	—	—
None—will train	44	32	6	2	4	—	—	—	—	—	—
Experience	31	13	10	—	7	—	1	—	—	—	—
Apprenticeship	—	—	—	—	—	—	—	—	—	—	—
Short Training Course	—	—	—	—	—	—	—	—	—	—	—
Specialized H.S. Course	—	—	—	—	—	—	—	—	—	—	—
Special Courses	—	—	—	—	—	—	—	—	—	—	—
Technical Institute	—	—	—	—	—	—	—	—	—	—	—
Specialized College	—	—	—	—	—	—	—	—	—	—	—
Mixed	—	—	—	—	—	—	—	—	—	—	—
Total	385	254	64	12	54	—	1	—	—	—	—

Table III-40

Education and Training Requirements for Service Workers Entry Jobs in Non-Manufacturing

					Years of School						
Training	Total	No Requirements	4-8	9-11	12	12-14 Post-H.S.	Technical Institute	Some College	16	17+	Mixed
None	328	—	108	48	171	—	—	—	—	—	1
None—will train	159	104	9	6	38	1	—	—	1	—	—
Experience	264	126	34	7	97	—	—	—	—	—	—
Apprenticeship	—	—	—	—	—	—	—	—	—	—	—
Short Training Course	41	4	—	—	32	5	—	—	—	—	—
Specialized H.S. Course	—	—	—	—	—	—	—	—	—	—	—
Special Courses	4	—	—	—	4	—	—	—	—	—	—
Technical Institute	38	1	2	5	5	17	8	—	—	—	—
Specialized College	3	—	—	—	—	—	—	—	3	—	—
Mixed	—	—	—	—	—	—	—	—	—	—	—
Total	837	235	153	66	347	23	8	—	4	—	1

APPENDICES

Appendix A contains tables for each major industry group, showing occupational distribution for 1960, 1968, projections to 1975, and the amount of change, number of replacements, and total needs to 1975. Sources of the data are described in Chapter I, the section on How Projections Were Made.

Appendix B contains education and training requirements for specific jobs in each occupation group in each major industry group with a significant number of entry jobs.

Appendix C contains a brief bibliography of material relevant to the study and to Maine.

APPENDIX A

TABLE A-1

Occupational Distribution for Contract Construction (SIC 15, 16, 17) in Maine
1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	20365	100.0	15500	100.0	18000	100.0	2500	2237	4737
Professional, Technical, and Kindred Workers	791	3.9	294	1.9	378	2.1	84	51	135
Managers and Officials	1722	8.5	1582	10.2	1962	10.9	380	277	657
Sales Workers	56	0.3	166	1.1	216	1.2	50	35	85
Clerical and Kindred Workers	720	3.5	772	5.0	1008	5.6	236	184	420
Craftsmen, Foremen, and Kindred Workers	11957	58.7	8166	52.6	9144	50.8	976	1143	2119
Operatives and Kindred Workers	1939	9.5	1838	11.8	2448	13.6	610	257	867
Laborers	3101	15.2	2629	17.0	2772	15.4	143	276	419
Service Workers	79	0.4	55	0.4	72	0.4	17	14	31

Note: See text for source of data

TABLE A-2

Occupational Distribution for Food Products (SIC 20) in Maine
1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	11654	100.0	12700	100.0	14100	100.0	1400	1778	3178
Professional, Technical, and Kindred Workers	168	1.4	171	1.3	212	1.5	41	30	71
Managers and Officials	828	7.1	750	5.9	832	5.9	82	131	213
Sales Workers	610	5.2	507	4.0	578	4.1	71	106	177
Clerical and Kindred Workers	1053	9.0	684	5.3	804	5.7	120	230	350
Craftsmen, Foremen, and Kindred Workers	1631	14.0	1102	8.7	1311	9.3	209	154	363
Operatives and Kindred Workers	6323	54.3	6061	71.6	8150	57.8	2089	695	1272
Laborers	895	7.7	3030	15.7	1805	22.8	–1225	348	635
Service Workers	147	1.3	394	3.1	408	2.9	14	84	98

TABLE A-3

Occupational Distribution for Textile Mill Products (SIC 22) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	15700	100.0	12156	100.0	9660	100.0	–2504	1708	–796
Professional, Technical, and Kindred Workers	208	1.3	109	0.9	106	1.1	–3	19	16
Managers and Officials	271	1.7	620	5.1	531	5.5	–89	109	20
Sales Workers	39	0.3	24	0.2	19	0.2	–5	5	–
Clerical and Kindred Workers	913	5.8	498	4.1	454	4.7	–44	119	75
Craftsmen, Foremen, and Kindred Workers	2006	12.8	1398	11.5	1285	13.3	–113	194	81
Operatives and Kindred Workers	10831	69.0	6734	55.4	5303	54.9	–1431	936	–495
Laborers	1197	7.6	2504	20.6	1768	18.3	–736	261	–475
Service Workers	235	1.5	267	2.2	184	1.9	–83	65	–18

TABLE A-4

Occupational Distribution for Apparel and Related Products (SIC 23) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	2944	100.0	3929	100.0	7080	100.0	3144	576	3720
Professional, Technical, and Kindred Workers	20	0.7	15	0.4	35	0.5	20	3	23
Managers and Officials	105	3.6	188	4.8	333	4.7	145	33	178
Sales Workers	22	0.8	35	0.9	71	1.0	36	7	43
Clerical and Kindred Workers	117	4.0	139	3.5	269	3.8	130	33	163
Craftsmen, Foremen, and Kindred Workers	192	6.5	91	2.3	184	2.6	93	13	106
Operatives and Kindred Workers	2437	82.8	3334	84.9	5961	84.2	2627	467	3094
Laborers	43	1.5	84	2.1	142	2.0	58	9	67
Service Workers	8	0.3	43	1.1	78	1.1	35	11	46

TABLE A-5

Occupational Distribution for Lumber and Wood Products (SIC 24, 25) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	16457	100.0	16438	100.0	15300	99.9	−1138	2284	1146
Professional, Technical, and Kindred Workers	83	0.5	230	1.4	245	1.6	15	40	55
Managers and Officials	845	5.1	1068	6.5	933	6.1	−135	187	52
Sales Workers	49	0.3	181	1.1	168	1.1	−13	38	25
Clerical and Kindred Workers	618	3.8	789	4.8	734	4.8	−55	187	132
Craftsmen, Foremen, and Kindred Workers	1981	12.0	2038	12.4	2020	13.2	−18	286	268
Operatives and Kindred Workers	6951	42.2	6345	38.6	6013	39.3	−332	887	555
Laborers	5788	35.2	5441	33.1	4850	31.7	−591	571	−20
Service Workers	142	0.9	362	2.2	321	2.1	−41	88	47

TABLE A-6

Occupational Distribution for Paper and Allied Products (SIC 26) in Maine 1960, 1968, and Projected Needs for 1975

	1960* Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	18110	—	17660	99.8	19100	99.9	1440	2610	4050
Professional, Technical, and Kindred Workers			1201	6.8	1566	8.2	365	209	574
Managers and Officials			989	5.6	1127	5.9	138	173	311
Sales Workers			106	0.6	134	0.7	28	22	50
Clerical and Kindred Workers			1289	7.3	1394	7.3	105	308	413
Craftsmen, Foremen, and Kindred Workers			4362	24.7	5444	28.5	1082	613	1695
Operatives and Kindred Workers			6375	36.1	6666	34.9	291	895	1186
Laborers			3002	17.0	2426	12.7	−576	317	−259
Service Workers			300	1.7	325	1.7	25	73	98

*Occupational distribution for State not available

Table A-7

Occupational Distribution for Printing and Publishing (SIC 27) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	4069	100.0	2587	100.0	2201	100.0	–386	435	49
Professional, Technical, and Kindred Workers	510	12.5	334	12.9	296	13.4	–38	58	20
Managers and Officials	298	7.3	251	9.7	220	10.0	–31	44	13
Sales Workers	1223	30.1	142	5.5	127	5.8	–15	30	15
Clerical and Kindred Workers	538	13.2	414	16.0	360	16.3	–54	98	44
Craftsmen, Foremen, and Kindred Workers	1135	27.9	939	36.3	760	34.6	–179	131	–48
Operatives and Kindred Workers	299	7.4	292	11.3	272	12.3	–20	41	21
Laborers	49	1.2	140	5.4	110	5.0	–30	15	–15
Service Workers	17	0.4	75	2.9	56	2.6	–19	18	–1

Table A-8

Occupational Distribution for Chemicals and Allied Products (SIC 28) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	1127	100.0	1374	100.0	1170	99.9	–204	196	–8
Professional, Technical, and Kindred Workers	54	4.8	80	5.8	89	7.6	9	14	23
Managers and Officials	135	12.0	91	6.6	81	6.9	–10	16	6
Sales Workers	112	9.9	51	3.7	47	4.0	–4	11	7
Clerical and Kindred Workers	148	13.1	71	5.2	64	5.5	–7	17	10
Craftsmen, Foremen, and Kindred Workers	208	18.5	69	5.0	66	5.6	–3	10	7
Operatives and Kindred Workers	302	26.8	518	37.7	507	43.3	–11	73	62
Laborers	146	13.0	475	34.6	302	25.8	–173	50	–123
Service Workers	22	2.0	19	1.4	14	1.2	–5	5	–

TABLE A-9

Occupational Distribution for Rubber and Miscellaneous Plastics (SIC 30) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	1185	100.0	2550	100.2	2880	100.0	330	357	687
Professional, Technical, and Kindred Workers	49	4.1	5	0.2	6	0.2	1	4	5
Managers and Officials	66	5.6	110	4.3	121	4.2	11	19	30
Sales Workers	17	1.4	48	1.9	57	2.0	11	10	21
Clerical and Kindred Workers	97	8.2	120	4.7	138	4.8	18	19	37
Craftsmen, Foremen, and Kindred Workers	237	20.0	207	8.1	256	8.9	49	29	78
Operatives and Kindred Workers	638	53.8	757	68.9	2002	69.5	245	246	491
Laborers	77	6.5	278	10.9	271	9.4	–7	29	22
Service Workers	4	0.3	31	1.2	29	1.0	–2	1	–1

TABLE A-10

Occupational Distribution for Leather and Leather Products (SIC 31) in Maine 1960, 1968, and Projected Needs for 1975

	1960* Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	24060	—	30734	99.9	30920	100.7	186	4062	4248
Professional, Technical, and Kindred Workers			123	0.4	124	0.4	1	22	23
Managers and Officials			799	2.6	804	2.6	5	139	144
Sales Workers			246	0.8	247	0.8	1	51	52
Clerical and Kindred Workers			1322	4.3	1453	4.7	131	31	162
Craftsmen, Foremen, and Kindred Workers			1598	5.2	1762	5.7	164	222	386
Operatives and Kindred Workers			22467	73.1	22572	73.0	105	3133	3238
Laborers			3934	12.8	3927	12.8	–7	412	405
Service Workers			215	0.7	216	0.7	1	52	53

*Occupational distribution not available

TABLE A-11

Occupational Distribution for Other Durables (SIC 32, 33, 38, 39) in Maine
1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	2829	100.0	3256	100.0	3490	99.9	231	200	431
Professional, Technical, and Kindred Workers	75	2.7	67	2.1	87	2.5	20	26	46
Managers and Officials	204	7.2	255	7.8	265	7.6	10	12	22
Sales Workers	88	3.1	96	2.9	98	2.8	2	1	3
Clerical and Kindred Workers	145	5.1	298	9.2	328	9.4	30	40	70
Craftsmen, Foremen, and Kindred Workers	662	23.4	545	16.7	611	17.5	66	8	74
Operatives and Kindred Workers	1465	51.8	1494	45.9	1644	47.1	150	8	158
Laborers	165	5.8	485	14.9	440	12.6	–45	11	–34
Service Workers	25	0.9	16	0.5	14	0.4	–2	94	92

TABLE A-12

Occupational Distribution for Fabricated Metal Products (SIC 34) in Maine
1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	1904	100.0	2188	100.0	2200	99.9	12	335	347
Professional, Technical, and Kindred Workers	126	6.6	182	8.3	199	9.1	17	32	49
Managers and Officials	152	8.0	153	7.0	154	7.0	1	27	28
Sales Workers	85	4.5	48	2.2	48	2.2	–	10	10
Clerical and Kindred Workers	191	10.0	189	8.6	191	8.6	2	45	47
Craftsmen, Foremen, and Kindred Workers	547	28.7	640	29.2	652	29.5	12	90	102
Operatives and Kindred Workers	705	37.0	741	33.9	751	34.2	10	104	114
Laborers	94	4.9	223	10.2	195	8.8	–28	23	–5
Service Workers	4	0.2	13	0.6	14	0.5	1	3	4

Table A-13

Occupational Distribution for Machinery, Except Electrical (SIC 35) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	2980	100.0	2621	100.0	3000	100.0	377	411	788
Professional, Technical, and Kindred Workers	158	5.3	102	3.9	138	4.6	36	18	54
Managers and Officials	249	8.4	225	8.6	296	9.6	71	39	110
Sales Workers	85	2.9	97	3.7	93	3.3	–4	20	16
Clerical and Kindred Workers	281	9.4	257	9.8	300	10.0	43	61	104
Craftsmen, Foremen, and Kindred Workers	1157	38.9	1014	38.7	1103	37.4	89	142	231
Operatives and Kindred Workers	937	31.4	771	29.4	898	29.8	127	108	235
Laborers	74	2.5	113	4.3	118	3.8	5	12	17
Service Workers	39	1.3	45	1.7	55	1.5	10	11	21

Table A-14

Occupational Distribution for Electrical Machinery Equipment and Supplies (SIC 36) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	2491	100.0	4545	100.0	6700	100.0	2150	667	2817
Professional, Technical, and Kindred Workers	303	12.2	210	4.6	362	5.4	152	37	189
Managers and Officials	80	3.2	221	4.9	295	4.4	74	39	113
Sales Workers	82	3.3	16	0.4	27	0.4	11	3	14
Clerical and Kindred Workers	297	11.9	181	4.0	181	3.8	74	43	117
Craftsmen, Foremen, and Kindred Workers	530	21.3	262	5.8	262	6.1	147	37	184
Operatives and Kindred Workers	1122	45.0	3311	72.9	4918	73.4	1607	464	2071
Laborers	52	2.1	289	6.4	355	5.3	66	30	96
Service Workers	25	1.0	55	1.2	74	1.1	19	14	33

TABLE A-15

Occupational Distribution for Transportation Equipment (SIC 37) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	8576	100.0	5162	100.0	8230	100.0	3068	776	3844
Professional, Technical, and Kindred Workers	512	6.0	253	4.9	428	5.2	175	44	219
Managers and Officials	213	2.5	372	7.2	617	7.5	245	65	310
Sales Workers	24	0.3	36	0.7	58	0.7	22	8	30
Clerical and Kindred Workers	914	10.7	310	6.0	494	6.0	184	73	257
Craftsmen, Foremen, and Kindred Workers	4572	53.3	2591	50.2	4057	49.3	1466	363	1829
Operatives and Kindred Workers	1844	21.5	1234	23.9	2041	24.8	807	171	978
Laborers	395	4.6	279	5.4	387	4.7	108	29	137
Service Workers	102	1.2	93	1.8	140	1.7	47	23	70

TABLE A-16

Occupational Distribution for Trucking & Warehousing (SIC 42) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	4627	100.0	4418	100.0	4800	100.0	393	704	1097
Professional, Technical, and Kindred Workers	13	0.3	18	0.4	19	0.4	1	33	34
Managers and Officials	419	9.1	446	10.1	432	9.0	–14	78	64
Sales Workers	29	0.6	88	2.0	110	2.3	22	19	41
Clerical and Kindred Workers	362	7.8	490	11.1	562	11.7	72	116	188
Craftsmen, Foremen, and Kindred Workers	390	8.4	278	6.3	326	6.8	49	39	88
Operatives and Kindred Workers	2969	64.2	2682	60.7	2971	61.9	289	373	662
Laborers	433	9.4	393	8.9	365	7.6	–28	41	13
Service Workers	12	0.3	22	0.5	24	0.5	2	5	7

TABLE A-17

Occupational Distribution for Communications (SIC 48) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	4216	100.0	4214	100.0	4000	100.0	–214	832	616
Professional, Technical, and Kindred Workers	463	11.0	538	12.8	580	14.5	42	94	136
Managers and Officials	328	7.8	493	11.7	536	13.4	43	86	129
Sales Workers	67	1.6	110	2.6	112	2.8	2	23	25
Clerical and Kindred Workers	2102	49.9	1942	46.1	1660	41.5	–282	462	180
Craftsmen, Foremen, and Kindred Workers	1106	26.2	966	22.9	964	24.1	–2	135	133
Operatives and Kindred Workers	37	0.9	82	1.9	72	1.8	–10	12	2
Laborers	4	0.1	7	0.2	8	0.2	1	1	2
Service Workers	109	2.6	78	1.9	68	1.7	–10	19	9

TABLE A-18

Occupational Distribution for Public Utilities (SIC 49) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	4310	100.0	3150	100.0	2900	100.0	–250	617	369
Professional, Technical, and Kindred Workers	270	6.3	306	9.7	319	11.0	13	57	70
Managers and Officials	354	8.2	233	7.4	212	7.3	–21	48	27
Sales Workers	12	0.3	19	0.6	17	0.6	–2	6	4
Clerical and Kindred Workers	940	21.8	674	21.4	589	20.3	–85	195	110
Craftsmen, Foremen, and Kindred Workers	1679	39.0	1194	37.9	1154	39.8	–40	194	154
Operatives and Kindred Workers	614	14.3	413	13.1	368	12.7	–45	70	25
Laborers	401	9.3	265	8.4	206	7.1	–59	33	–26
Service Workers	40	0.9	44	1.4	35	1.2	–9	14	5

TABLE A-19

Occupational Distribution for Other Transportation (SIC 41, 44-47) in Maine
1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	3180	100.0	2120	100.0	1900	100.0	–219	324	105
Professional, Technical, and Kindred Workers	79	2.5	64	3.0	61	3.2	–3	11	8
Managers and Officials	404	12.7	310	14.6	277	14.6	–33	54	21
Sales Workers	8	0.3	13	0.6	13	0.7	–	3	3
Clerical and Kindred Workers	400	12.6	240	11.3	226	11.9	–14	56	42
Craftsmen, Foremen, and Kindred Workers	278	8.8	231	10.9	203	10.7	–28	32	4
Operatives and Kindred Workers	1691	53.2	890	42.0	819	43.1	–71	124	53
Laborers	218	6.9	335	15.8	271	14.2	–64	35	–29
Service Workers	102	3.2	36	1.7	30	1.6	–6	9	3

TABLE A-20

Occupational Distribution for Wholesale Trade (SIC 50) in Maine
1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	11423	100.0	15429	100.0	17700	100.0	2271	2654	4925
Professional, Technical, and Kindred Workers	116	1.0	324	2.1	424	2.4	100	54	154
Managers and Officials	2301	20.2	2330	15.1	2584	14.6	254	406	660
Sales Workers	2106	18.4	2407	15.6	2690	15.2	283	507	790
Clerical and Kindred Workers	2064	18.1	2963	19.2	3433	19.4	470	706	1176
Craftsmen, Foremen, and Kindred Workers	803	7.0	1451	9.4	2000	11.3	549	203	752
Operatives and Kindred Workers	2731	24.0	4089	26.5	4690	26.5	601	572	1173
Laborers	1241	10.9	1790	11.6	1840	10.4	50	187	237
Service Workers	61	0.5	77	0.5	70	0.4	–7	19	12

TABLE A-21

Occupational Distribution for Retail Trade (SIC 52-59) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	48932	99.9	46200	100.0	47300	100.0	1100	8869	9969
Professional, Technical, and Kindred Workers	671	1.3	647	1.4	615	1.3	–32	113	81
Managers and Officials	10485	21.4	7346	15.9	6811	14.4	–535	1286	751
Sales Workers	15058	30.8	11596	25.1	11588	24.5	–8	2435	2427
Clerical and Kindred Workers	5482	11.2	6006	13.0	6669	14.1	663	1429	2092
Craftsmen, Foremen, and Kindred Workers	4199	8.6	4712	10.2	5298	11.2	586	660	1246
Operatives and Kindred Workers	5403	11.0	4158	9.0	4494	9.5	336	582	918
Laborers	1510	3.1	3650	7.9	3595	7.6	–55	383	328
Service Workers	6115	12.5	8085	17.5	8183	17.3	98	1981	2079

TABLE A-22

Occupational Distribution for Finance, Insurance and Real Estate (SIC 60-67) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	9624	100.0	11548	100.0	12800	100.1	1252	2512	3775
Professional, Technical, and Kindred Workers	200	2.1	439	3.8	499	3.9	60	77	137
Managers and Officials	1935	20.1	2275	19.7	2713	21.2	438	396	834
Sales Workers	2028	21.1	1328	11.5	1420	11.1	92	278	370
Clerical and Kindred Workers	4653	48.4	6767	58.6	7488	58.5	721	1606	2327
Craftsmen, Foremen, and Kindred Workers	205	2.1	46	0.4	51	0.4	5	6	11
Operatives and Kindred Workers	41	0.4	58	0.5	64	0.5	6	8	14
Laborers	228	2.4	81	0.7	90	0.7	9	9	18
Service Workers	334	3.5	554	4.8	486	3.8	–68	132	64

TABLE A-23

Occupational Distribution for Miscellaneous Services (SIC 70-89) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	16670	100.0	16580	100.0	18197	100.0	1617	3103	4720
Professional, Technical, and Kindred Workers	2532	15.2	2077	12.5	2635	14.5	558	325	883
Managers and Officials	2303	13.8	1825	11.0	1890	10.4	65	354	419
Sales Workers	426	2.6	538	3.2	581	3.2	43	199	242
Clerical and Kindred Workers	2465	14.8	2430	14.7	3011	16.5	581	551	1132
Craftsmen, Foremen, and Kindred Workers	2495	15.0	1149	6.9	1220	6.7	71	187	258
Operatives and Kindred Workers	2411	14.5	2125	12.8	2213	12.1	88	302	390
Laborers	468	2.8	1135	6.9	1278	7.0	143	119	262
Service Workers	3570	21.4	5301	32.0	5369	29.5	68	1066	1134

TABLE A-24

Occupational Distribution for Public Administration (SIC 91, 92, 93) in Maine 1960, 1968, and Projected Needs for 1975

	1960 Employment		1968 Employment		1975 Projected Employment		Change 1968-1975	Replacements 1968-1975	Total Needs to 1975
	No. (1)	% (2)	No. (3)	% (4)	No. (5)	% (6)	(7)	(8)	(9)
Total Employment	16454	100.0	27700	99.9	30400	100.0	2700	5544	8244
Professional, Technical, and Kindred Workers	1646	10.0	5235	18.9	6414	21.1	1179	917	2096
Managers and Officials	3161	19.2	2880	10.4	3222	10.6	342	504	846
Sales Workers	52	0.3	554	2.0	578	1.9	24	116	142
Clerical and Kindred Workers	6468	39.3	6869	24.8	7083	23.3	214	1635	1849
Craftsmen, Foremen, and Kindred Workers	1266	7.7	1939	7.0	2128	7.0	189	272	461
Operatives and Kindred Workers	558	3.4	1523	5.5	1459	4.8	–64	213	149
Laborers	522	3.2	1689	6.1	1550	5.1	–139	177	38
Service Workers	2781	16.9	6980	25.2	7934	26.1	954	1710	2664

APPENDIX B

TABLE B-1

Hiring Requirements for Particular Entry Jobs for Professional

	Manufacturing Industries					Non-M		
	Transportation Equipment (37)	Electrical Machinery (36)	Non-electrical Machinery (35)	Fabricated Metal (34)	Paper (26)	Contract Construction (15-17)	Trucking and Warehousing (42)	Other Transportation (41, 44-47)
Engineers:								
High school (or less)	1							
High school (or less); experience						1		
Apprenticeship or short training course								
Technical institute or other post-high school training				1				
Some college			1			7		
College degree; experience	1	2	3	1	1	6		
College degree; specialized	6	6	4	7	11	7		
17+ Graduate work	1	3			2	2		1
Mixed						1		
Total number of firms with entry jobs	9	11	8	9	14	24	–	1
Accountants & Auditors:								
High school (or less)								1
High school (or less); experience								
Technical institute or other post-high school training			2			2	1	
Some college	1					2	2	1
College degree; specialized & experience	1	3	1		7	6		3
17+ Graduate work					1			
Total number of firms with entry jobs	2	3	3	0	8	10	3	5

	Communications (48)
Cameramen, News Photographers:	
High school (or less)	2
Apprenticeship	1
Technical institute or other post-high school training	2
Total number of firms with entry jobs	5
Writers:	
High school (or less)	2
High school (or less); experience	1
Technical institute or other post-high school training	1
Total number of firms with entry jobs	4
Announcers, Newsmen, Disc Jockeys:	
High school (or less)	8
High school (or less); experience	2
Apprenticeship or short training course	6
Technical institute or other post-high school training	6
Technical institute or other post-high school training; experience	2
Some college	1
College degree; experience	1
College degree; specialized	2
Total number of firms with entry jobs	28

	Person Servic (72)
Morticians:	
Technical institute or other post-high school training	4
Technical institute or other post-high school training; experience	2
Some college	4
College degree; specialized	4
17+ Graduate work	1
Total number of firms with entry jobs	15

	Wholesale Trade (50)	Retail Trade (52-59)
Personnel Managers:		
High school (or less); experience		1
College degree; experience	1	
College degree; specialized	1	1
Total number of firms with entry jobs	2	2
Pharmacists:		
Technical institute or other post-high school training		1
College degree; experience		2
College degree; specialized		29
17+ Graduate work		74
Total number of firms with entry jobs		106

APPENDIX B

TABLE B-1

Hiring Requirements for Particular Entry Jobs for Professional Workers

tries

	ec- ery	Fabricated Metal (34)	Paper (26)	Contract Construction (15-17)	Trucking and Warehousing (42)	Other Transportation (41, 44-47)	Communications (48)	Utilities and Sanitary (49)	Wholesale trade (50)	Retail trade (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
						Non-Manufacturing Industries							
							2		1				
				1									
							7						
		1					8	1	1	2			
				7				4					
		1	1	6			3	1	2	1	4	4	3
		7	11	7			2	1	7	4	1	9	18
			2	2		1	1		4	3	1		3
				1									
		9	14	24	–	1	23	7	15	10	6	13	24
						1							
							1	1					
				2	1		1	1	4	5	5	4	2
				2	2	1			1	1			
			7	6		3	1	1	12	18	17	21	6
			1							2	1		
		0	8	10	3	5	3	3	17	26	23	25	8

	Personal Services (72)
nstitute or other post-high school training	4
nstitute or other post-high aining; experience	2
ge	4
ree; specialized	4
ate work	1
l number of firms with entry jobs	15

	Wholesale Trade (50)	Retail Trade (52-59)
nagers:		
l (or less); experience		1
ree; experience	1	
ree; specialized	1	1
l number of firms with entry jobs	2	2
nstitute or other post-high aining		1
ree; experience		2
ree; specialized		29
ate work		74
l number of firms with entry jobs		106

	Federal, State, & Local Government (91, 92, 93)
Soil Scientists & Foresters:	
High school (or less)	1
High school (or less); experience	1
Apprenticeship or short training course	3
Technical institute or other post-high school training	2
College degree; experience	4
College degree; specialized	19
17+ Graduate work	5
Total number of firms with entry jobs	35
Social Scientists, & Economists & Related:	
College degree; specialized	3
17+ Graduate work	1
Total number of firms with entry jobs	4
Librarians:	
High school (or less)	2
High school (or less); experience	1
Apprenticeship or short training course	1
Technical institute or other post-high school training	1
Some college	1
College degree; experience	1
College degree; specialized	4
17+ Graduate work	2
Total number of firms with entry jobs	13

TABLE B-2

Hiring Requirements for Particular Entry Jobs for Technical Workers

	Paper (26)	Fabricated Metal (34)	Non-electrical Machinery (35)	Electrical Machinery (36)	Transportation Equipment (37)	Contract Construction (15-17)	Wholesale Trade (50)	Retail Trade (52-59)	M Ser (7(
Draftsmen:									
High school (or less)	1				2	3			
High school (or less); experience								2	
High school special courses									
Apprenticeship or short training course		1							
Technical institute or other post-high school training	4	2	3	3	1	3	2	2	
Technical institute or other post-high school training; experience	1	1	2		1	5			
Some college		2	1						
College degree; experience						1		1	
Mixed						3			
Total number of firms with entry jobs	6	6	6	3	4	15	2	5	

	Fabricated Metal (34)	Non-electrical Machinery (35)	Electrical Machinery (36)	Contract Construction (15-17)	Misc. Services (70-89)	Public Administration (91-93)
Engineering Aide:						
High school (or less)				3		
High school (or less); experience					1	1
Technical institute or other post-high school training	1	1	1	3	1	3
Technical institute or other post-high school training; experience		1	3	5		
Some college						1
College degree; experience			1	1	1	
17+ Graduate work					1	
Mixed				3		
Total number of firms with entry jobs	1	2	5	15	4	5

	Paper (26)	Fabricated Metal (34)	Non-electrical Machinery (35)	Electrical Machinery (36)	Transportation Equipment (37)	Finance, Insurance, Real Estate (60-67)
Computer Programmers:						
High school (or less)	1				1	
Technical institute or other post-high school training		1	1		1	4
Technical institute or other post-high school training; experience						4
Some college			1			
College degree; specialized	1					2
Total number of firms with entry jobs	2	1	2		2	10

ical Workers

Contract Construction (15-17)	Wholesale Trade (50)	Retail Trade (52-59)	Misc. Services (70-89)	Public Administration (91-93)
3				1
		2		
			1	
3	2	2	12	3
5			1	1
1		1	1	
3				
15	2	5	15	5

Public Administration (91-93)
1
3
1
5

Finance, Insurance, Real Estate (60-67)
4
4
2
10

	Communications (48)	Electrical Machinery (36)
Electrical Technicians:		
High school (or less)	1	
High school; special courses	1	
High school (or less); experience	2	
Technical institute or other post-high school training	7	4
College degree	—	1
Total number of firms with entry jobs	11	5

	Personal Services (72)
Embalmers & Mortuary Assistants:	
High school (or less)	2
Technical institute or other post-high school training	6
17+ Graduate work	2
Total number of firms with entry jobs	10

	Wholesale Trade (50)	Retail Trade (52-59)
Electronics Technicians:		
Technical institute or other post-high school training	3	1
Technical institute or other post-high school training; experience	1	3
Total number of firms with entry jobs	4	4

	Federal, State, & Local Government (91, 92, 93)
Natural Scientists:	
High school (or less)	2
High school; special courses	1
High school (or less); experience	6
Technical institute or other post-high school training	3
Technical institute or other post-high school training; experience	2
Some college	2
College degree; experience	2
Total number of firms with entry jobs	18
Laboratory Technicians:	
High school (or less)	1
Technical institute or other post-high school training	4
College degree; specialized	1
Total number of firms with entry jobs	6

TABLE B-3
Hiring Requirements for Particular Entry Jobs f

	Food (20)	Apparel (23)	Paper (26)	Transportation Equipment (37)	Contract Construction (15-17)	Transportation (41, 44-47)
Officials:						
High school (or less)	3				7	1
High school (or less); experience	5			1	6	4
Apprenticeship or short training course					1	
Technical institute or other post-high school training					1	
Technical institute or other post-high school training; experience					6	
Some college				7	1	
College degree; experience					5	1
College degree				1	4	3
17+ Graduate work						
Mixed					2	
Total number of firms with entry jobs	8			9	33	9
Buyers, Purchasers:						
High school (or less)	1				1	4
High school (or less); experience	1				2	12
Apprenticeship or short training course						
Technical institute or other post-high school training	1					2
Technical institute or other post-high school training; experience						
Some college	1	1	2	2	1	
College degree; experience						6
College degree	1					2
17+ Graduate work						
Mixed						
Total number of firms with entry jobs	5	1	2	2	4	26
Managers, Supervisors, Department Heads:						
High school (or less)	12		3		15	2
High school (or less); experience	11	5	2		14	
Apprenticeship or short training course	2	2			2	
Technical institute or other post-high school training	1				10	
Technical institute or other post-high school training; experience	2	1			7	
Some college	2		7		1	
College degree; experience	10				11	
College degree	8	5	1	1	9	2
17+ Graduate work	1					
Mixed					4	
Total number of firms with entry jobs	49	13	13	1	73	4

TABLE B-4
Hiring Requirements for Particular Entry Jobs for Sales W

	Food (20)	Apparel (23)	Paper (26)	Rubber & Plastic (30)	Leather (31)	Transportation Equipment (37)
Salesmen:						
High school (or less)	21	2	1	2		3
High school (or less); experience	15		1	2		4
Apprenticeship or short training course						
Technical institute or other post-high school training	1		1			
Technical institute or other post-high school training; experience					1	
Some college		1	4	6	3	1
College degree						
College degree; experience	2					
17+ Graduate work	2		1			
Mixed						
Total number of firms with entry jobs	41	3	8	10	4	8

TABLE B-3

ing Requirements for Particular Entry Jobs for Managerial Workers

Transportation Equipment (37)	Contract Construction (15-17)	Transportation (41, 44-47)	Trucking and Warehousing (42)	Communications (48)	Utilities and Sanitary (49)	Wholesale trade (50)	Retail trade (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
	7	1	2	3	2	10	10	7	4	5
	6	4	6	4	2	14	13	9	10	19
	1					2			2	3
	1		2	3		4	4	4	3	3
	6					6		3		
7	1						2	1		
	5	1	2	3		8	7	16	1	11
1	4	3	4	1		10	13	17	15	31
							7	1	3	3
	2									
9	33	9	16	14	4	54	56	58	38	75
	1	4	8	3	5	4	7		1	1
	2	12	10	8	4	2	8			
			1	6		1	1			
		2	4	3			3		1	
			1	1						
2	1									
		6	6	4	1		1		1	
		2	7	5	3	4	4			2
2	4	26	37	30	13	11	24		3	3
	15	2				33	158	12	45	13
	14		2			55	182	27	53	30
	2					8	20	3	6	8
	10					18	55	19	20	5
	7					11	18	8	4	4
	1						2	3	2	1
	11					22	22	28	15	7
1	9	2				9	36	16	23	51
						1	6		1	1
	4									1
1	73	4	2			157	499	116	169	121

TABLE B-4

irements for Particular Entry Jobs for Sales Workers

Rubber & Plastic (30)	Leather (31)	Transportation Equipment (37)	Contract Construction (15-17)	Utilities and Sanitary (49)	Wholesale trade (50)	Retail trade (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)
2		3	13	18	128	525	35	52
2		4	9	19	96	180	16	10
			1		7	16	11	
			1	8	14	29		7
	1		7	4	9	9		
6	3	1		2		1	2	
				2	10	4	8	1
			1	2	25	11	9	1
					2		1	
10	4	8	32	55	291	775	82	71

TABLE B-4 (Continued)

	Retail trade (52-59)	Public Adminis-tration (91-93)
Sales Clerks:		
High school (or less)	185	1
High school (or less); experience	49	3
Apprenticeship or short training course	2	
Technical institute or other post-high school training	8	
College degree; experience	3	
Total number of firms with entry jobs	277	4

	Retail trade (52-59)
Parts Men:	
High school (or less)	23
High school (or less); experience	22
Technical institute or other post-high school training	1
Total number of firms with entry jobs	46

	Finance, Insurance Real Esta (60-67)
Insurance Agents & Brokers:	
High school (or less); experience	2
Apprenticeship or short training course	1
Technical institute or other post-high school training	1
Technical institute or other post-high school training; experience	2
College degree; experience	4
College degree; specialized	3
Total number of firms with entry jobs	13
Underwriters:	
High school (or less)	1
High school (or less); experience	4
College degree; experience	2
Total number of firms witn entry jobs	7

TABLE B-5
Hiring Requirements for Particular Entry Jobs for Office and Clerical W

	Food (20)	Apparel (23)	Paper (26)	Non-elec-trical Machinery (35)	Electrical Machinery (36)	Transpor-tation Equipment (37)	Contract Construc-tion (15-17)	Trucking and Ware-housing (42)	Other Transpor-tation (41, 44-47)
Stenographers, Secretaries & Typists:									
High school (or less)	29	2	9	2	3	1	30	21	10
High school (or less); experience	7					1	8	2	7
Apprenticeship or short training course								1	
Technical institute or other post-high school training	4						12	4	2
Technical institute or other post-high school training; experience	1	1	4				1	4	
Some college									
College degree; experience								1	
College degree; specialized					2				2
Mixed							2		
Total number of firms with entry jobs	44	3	13	2	5	2	53	33	21
General Office:									
High school (or less)	36	3	18	5	2	1	36	21	9
High school (or less); experience	5	2	3				18	8	2
Apprenticeship or short training course						1			
Technical institute or other post-high school training	6	2	4		1		13	2	2
Technical institute or other post-high school training; experience	1						2	1	
Some college						2			
College degree; experience							1		
College degree; specialized					2	1	1		
Total number of firms with entry jobs	48	7	25	5	5	5	71	32	13
Bookkeepers:									
High school (or less)	37	3	2	2	2		93	30	13
High school (or less); experience	16	1	1				7	5	11
Apprenticeship or short training course	1	1			1				
Technical institute or other post-high school training	10	2	2				28	7	5
Technical institute or other post-high school training; experience	3						6	2	1
Some college							2		
College degree; experience									
College degree; specialized	1	2				1	2	2	
17+ Graduate work							3		
Total number of firms with entry jobs	68	9	5	2	3	1	141	46	30

TABLE B-4 (Continued)

	Finance, Insurance, Real Estate (60-67)
Insurance Agents & Brokers:	
High school (or less); experience	2
Apprenticeship or short training course	1
Technical institute or other post-high school training	1
Technical institute or other post-high school training; experience	2
College degree; experience	4
College degree; specialized	3
Total number of firms with entry jobs	13

	Finance, Insurance, Real Estate (60-67)
Underwriters:	
High school (or less)	1
High school (or less); experience	4
College degree; experience	2
Total number of firms with entry jobs	7

	Finance, Insurance, Real Estate (60-67)
Real Estate Brokers:	
Technical institute or other post-high school training; experience	2
Total number of firms with entry jobs	2

	Retail Trade (52-59)
Produce Sales:	
High school (or less)	4
High school (or less); experience	1
Total number of firms with entry jobs	5

TABLE B-5

irements for Particular Entry Jobs for Office and Clerical Workers

Electrical Machinery (36)	Transportation Equipment (37)	Contract Construction (15-17)	Trucking and Warehousing (42)	Other Transportation (41, 44-47)	Communications (48)	Utilities and Sanitary (49)	Wholesale Trade (50)	Retail Trade (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
3	1	30	21	10	22	7	86	111	116	80	41
	1	8	2	7	1	1	14	22	21	13	9
			1					6		8	
		12	4	2	9	1	20	19	23	16	5
		1	4			2	4	4	7	4	1
					1	1		2		1	
			1						3		
2				2						2	
		2									
5	2	53	33	21	33	12	124	164	177	124	57
2	1	36	21	9	12	14	127	256	115	72	70
		18	8	2	2	2	33	51	26	15	44
	1							6			5
1		13	2	2			41	59	10	11	14
		2	1		3		1			2	
	2						1	1	2	3	
		1					1	1			
2	1	1						1	1		2
5	5	71	32	13	17	16	204	375	154	103	135
2		93	30	13	21	8	102	387	64	78	22
		7	5	11	2	2	40	89	23	16	13
1								3			
		28	7	5	7	3	29	160	14	36	3
		6	2	1			15	12	7	5	4
		2				1	1	3		2	1
							3	11	2		
	1	2	2				2	13	2	1	
		3					1				
3	1	141	46	30	30	14	193	678	112	138	43

TABLE B-5 (Continued)

	Food (20)	Non-electrical Machinery (35)	Wholesale Trade (50)	Retail Trade (52-59)	Finance, Insurance Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
Office Machine Operators:							
High school (or less)	6	1	10	1	6		
High school (or less); experience			5		3		
Apprenticeship or short training course				1			
Technical institute or other post-high school training	3		1		4		
Technical institute or other post-high school training; experience			1				
College; special course		1			1		
Total number of firms with entry jobs	9	2	17	2	14		
Tellers:							
High school (or less)					112		
High school (or less); experience					18		
Technical institute or other post-high school training					15		
Total number of firms with entry jobs					145		
Postal Workers:							
High school (or less); experience							2
Apprenticeship or short training course							8
Technical institute or other post-high school training							2
Total number of firms with entry jobs							12
Cashiers:							
High school (or less)				205		13	
High school (or less); experience				23		5	
Apprenticeship or short training course				2			
Technical institute or other post-high school training				3			
Total number of firms with entry jobs				233		18	

TABLE B-5 (Continued)

	Contract Construction (15-17)	Food (20)	Apparel (23)	Paper (26)
Other Clerical:				
High school (or less)	7	11	2	4
High school (or less); experience	7	2		
Apprenticeship or short training course		1	1	
Technical institute or other post-high school training	2	4		
Technical institute or other post-high school training; experience	2			
College degree; experience	1			
College; special course				
17+ Graduate work	1			
Total number of firms with entry jobs	20	18	3	4

	Transportation (41, 44-47)	Trucking and Warehousing (42)	Communications (48)	Utilities and Sanitary (49)	Wholesale Trade (50)	Retail Trade (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
Other Clerical:									
High school (or less)	14	13	6	12	67	99	20	24	15
High school (or less); experience	1	3	3	1	3	17	7	5	2
Apprenticeship or short training course				1	1	1	2	5	2
Technical institute or other post-high school training		3	3	1		7	4	3	6
Technical institute or other post-high school training; experience			1		2	1	4		1
College degree; experience					1	1	9	2	3
College; special course							4		1
17+ Graduate work							2		
Total number of firms with entry jobs	15	19	13	15	74	126	52	39	30

TABLE B-6

Hiring Requirements for Particular Entry Jobs for Craftsmen

	Food (20)	Transportation Equipment (37)	Contract Construction (15-17)	Transportation Public Utilities (40-49)	Retail Trade (52-59)	Public Administration (91-93)
Carpenters:						
High school (or less)	1	1	17	2	4	1
High school (or less); experience	2	11	141	4	12	3
Apprenticeship or short training course			7			
Technical institute or other post-high school training			2			1
Technical institute or other post-high school training; experience			3			
Some college						
College degree; experience						
College degree; specialized						
17+ Graduate work						
Mixed			2			
Total number of firms with entry jobs	3	12	172	6	16	5

	Textiles (22)	Apparel (23)	Lumber (24)	Furniture (25)	Paper (26)	Leather (31)
Millwrights:						
High school (or less)			2			
High school (or less); experience	2		9	1	2	1
Short training course			1			
Technical institute or other post-high school training			2		1	
Total number of firms with entry jobs	2		14	1	3	1

	Contract Construction (15-17)	Wholesale Trade (50)	Retail Trade (52-59)
Plumbers & Pipefitters:			
High school (or less)	7		3
High school (or less); experience	14	3	9
Apprenticeship or short training course	14	1	
Technical institute or other post-high school training	4		4
Technical institute or other post-high school training; experience	2		2
Some college			
College degree; experience			
College degree; specialized			
17+ Graduate work			
Mixed	5		
Total number of firms with entry jobs	46	4	18

	Retail Trade (52-59)	Misc. Services (70-89)
Bodymen:		
High school (or less)	22	10
High school (or less); experience	44	12
Apprenticeship or short training course	5	
Technology or post-high school	5	1
Technology or post-high school, experience	1	
Total number of firms with entry jobs	77	23

TABLE B-6 (Continued)

	Food (20)	Tex-tile (22)	Apparel (23)	Lumber (24)	Furni-ture (25)	Paper (26)	Leather (31)	Fabri-cated Metal (34)	Non-elec-trical Machinery (35)	Electrical Machinery (36)	Transpor-tation Equipment (37)
Mechanics & Repairmen:											
High school (or less)	5	3	3	4			1		2		
High school (or less); experience	23	11		20	1	1	6		2	3	5
Apprenticeship or short training course		1					1		1		
Technical institute or other post-high school training	1			2		1				1	2
Technical institute or other post-high school training; experience							1				
Some college	1	4									
College degree; experience											
College degree; specialized											
17+ Graduate work											
Mixed	1										
Total number of firms with entry jobs	31	19	3	26	1	2	9		5	4	7
Foremen:											
High school (or less)	9		2	5		2	2	1	1		
High school (or less); experience	15	3	2	17	6		15	4	2		5
Apprenticeship or short training course		1		1				1	1		
Technical institute or other post-high school training	2	1	1	1		1					
Technical institute or other post-high school training; experience	2			1							
Some college											
College degree; experience									1		
College degree; specialized	1										
17+ Graduate work											
Mixed	1										
Total number of firms with entry jobs	30	5	5	25	6	3	17	6	5		5
Machinists:											
High school (or less)	3			2		1	3	1	10	1	3
High school (or less); experience	6		4	14	3	1	11	2	21	1	7
Apprenticeship or short training course				3		1	1		3	3	
Technical institute or other post-high school training	2			4		1			4	1	1
Technical institute or other post-high school training; experience				2		1		2	1		
Some college									1		
College degree; experience											
College degree; specialized											
17+ Graduate work											
Mixed											
Total number of firms with entry jobs	11		4	25	3	5	15	5	40	6	11

TABLE B-6 (Continued)

	Contract Construction (15-17)	Utilities and Sanitary (49)	Wholesale Trade (50)	Retail Trade (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
Mechanics & Repairmen:							
High school (or less)		17	35	122		23	4
High school (or less); experience	12	44	30	218		32	23
Apprenticeship or short training course		2	15	222		6	1
Technical institute or other post-high school training	1	9	17	84		12	6
Technical institute or other post-high school training; experience	1	2	1	8		1	
Some college			3				
College degree; experience							
College degree; specialized							
17+ Graduate work							
Mixed							
Total numbers of firms with entry jobs	14	74	101	654		74	34
Foremen:							
High school (or less)	7	9	16	17		2	6
High school (or less); experience	31	11	21	30	4	8	21
Apprenticeship or short training course	2	2	3	3		1	1
Technical institute or other post-high school training	5		3	7			
Technical institute or other post-high school training; experience	3	1	1	32			
Some college	3			1			1
College degree; experience		2					
College degree; specialized							
17+ Graduate work							
Mixed	3						
Total numbers of firms with entry jobs	54	25	44	80	4	11	29
Machinists:							
High school (or less)			8				
High school (or less); experience			5			1	
Apprenticeship or short training course			1			2	
Technical institute or other post-high school training			1				
Technical institute or other post-high school training; experience			2				
Some college							
College degree; experience			1				
College degree; specialized							
17+ Graduate work							
Mixed							
Total number of firms with entry jobs			18			3	

TABLE B-6 (Continued)

	Food (20)	Retail Trade (52-59)	Misc. Services (70-89)
Cooking Craftsmen Bakers & Frosters:			
High school (or less)	6	20	7
High school (or less); experience	2	22	
Technical institute or other post-high school training		3	3
Total number of firms with entry jobs	8	45	10

	Retail Trade (52-59)
Oil-burner Repairmen:	
High school (or less)	22
High school (or less); experience	27
Apprenticeship or short training course	14
Technical institute or other post-high school training	23
Technical institute or other post-high school training; experience	4
Total number of firms with entry jobs	90

	Contract Construction (15-17)
Concrete Finishers & Brickmasons:	
High school (or less)	4
High school (or less); experience	35
Apprenticeship or short training course	8
Technical institute or other post-high school training	2
Total number of firms with entry jobs	49
Painters & Paperhangers:	
High school (or less)	7
High school (or less); experience	34
Mixed	2
Total number of firms with entry jobs	43

	Transportation Public Utilities (40-49)
Linemen, Cablemen:	
High school (or less)	12
High school (or less); experience	2
Apprenticeship or short training course	2
Technical institute or other post-high school training	4
Total number of firms with entry jobs	20

	Retail Trade (52-59)
T.V. & Radar Technicians:	
High school (or less)	3
High school; special courses	2
High school (or less); experience	2
Technical institute or other post-high school training	5
Total number of firms with entry jobs	12

TABLE B-6 (Continued)

	Contract Construction (15-17)	Transportation Public Utilities (40-49)	Wholesale Trade (50)	Retail Trade (52-59)	Paper (26)	Electrical Machinery (36)
Electricians:						
High school (or less)	5	4		1		1
High school (or less); experience	11		1	4	2	3
Apprenticeship or short training course	10					
Technical institute or other post-high school training	6	1	4	2	2	
Technical institute or other post-high school training; experience	2			1		
Some college	2					
College degree	2					
Mixed	2					
Total number of firms with entry jobs	40	5	5	8	4	4

	Contract Construction (15-17)	Wholesale Trade (50)	Retail Trade (52-59)	Public Administration (91-93)
Equipment Operators:				
High school	7	4	1	8
High school (or less); experience	29	3	1	17
Apprenticeship or short training course		1		
Technical institute or other post-high school training	1			1
Total number of firms with entry jobs	38	8	2	26

	Misc. Machinery (36)	Electrical Services (70-89)
Inspectors:		
High school (or less)	2	3
Apprenticeship or short training course	1	
Technical institute or other post-high school training	1	1
Total number of firms with entry jobs	4	4

	Fabricated Metal (34)	Transportation Equipment (37)	Contract Construction (15-17)
Metal Working Craftsmen:			
High school (or less)	5	3	4
High school (or less); experience	3	7	10
Apprenticeship or short training course			1
Technical institute or other post-high school training	2	1	
College degree; specialized			1
Mixed			2
Total number of firms with entry jobs	10	11	18

	Lumber (24)
Machine Operators:	
High school (or less)	3
High school (or less); experience	11
Technical institute or other post-high school training	1
Total number of firms with entry jobs	15

	Lumber (24)
Lumber Graders:	
High school (or less)	4
High school (or less); experience	9
Technical institute or other post-high school training	3
Total number of firms with entry jobs	16

TABLE B-6 (Continued)

	Retail Trade (52-59)
Watch Repair & Jewelers:	
High school (or less)	3
High school (or less); experience	4
Apprenticeship or short training course	2
Technical institute or other post-high school training	4
Some college	1
Total number of firms with entry jobs	14

	Retail Trade (52-59)
Tailors:	
High school (or less)	1
High school; special courses	15
Total number of firms with entry jobs	16

	Retail trade (52-59)	Misc. Services (70-89)
Projectionists:		
High school (or less)		1
High school (or less); experience		8
Total number of firms with entry jobs		9
Upholsterers:		
High school (or less)	7	4
High school (or less); experience	6	2
Apprenticeship or short training course		2
Technical training	2	
Total number of firms with entry jobs	5	8
Maintenance Engineers:		
High school (or less); experience		6
Total number of firms with entry jobs		6

	Public Adminis-tration (91-93)
Conservation Aides:	
High school (or less)	2
High school (or less); experience	3
Some college	2
Total number of firms with entry jobs	7
Stationery Engineers:	
High school (or less); experience	2
Technical institute or other post-high school training; experience	1
Total number of firms with entry jobs	3

	Contract Construc-tion (15-17)
Masons:	
High school (or less)	4
High school (or less); experience	35
Apprenticeship or short training course	5
Technical institute or other post-high school training	3
Technical institute or other post-high school training; experience	2
Total number of firms with entry jobs	49

Table B-7

Hiring Requirements for Particular Entry Jobs for Operatives

	Paper (26)	Leather (31)	Fabricated (34)	Non-electrical Machinery (35)	Transportation Equipment (37)	Contract Construction (15-17)	Other Transportation (41, 44-47)	Wholesale Trade (50)	Retail Trade (52-59)	Misc. Services (70-89)
Apprentices:										
High school (or less)		1		1		14	1		3	
High school (or less); experience				1		1	1	1		
Apprenticeship or short training course	1	1	3	4	1	44	1	14	36	2
Technical institute or other post-high school training						6			2	
Total number of firms with entry jobs	1	2	3	6	1	65	3	15	41	2

	Non-electrical Machinery (35)
Welders:	
Apprenticeship or short training course	1
Technical institute or other post-high school training	2
Total number of firms with entry jobs	3

	Apparel (23)
Cutters, Stitchers:	
Technical institute or other post-high school training	1
College	1
Total number of firms with entry jobs	2

	Retail trade (52-59)
Meat Cutters:	
High school (or less)	6
Technical institute or other post-high school training	5
Total number of firms with entry jobs	11

Table B-8

Hiring Requirements for Particular Entry Jobs for Laborers

	Food (20)	Apparel (23)	Paper (26)	Leather (31)	Electrical Machinery (36)	Transportation Equipment (37)
Laborers:						
High school (or less)	41	5	21	29	3	7
High school (or less); experience	2					
Apprenticeship or short training course						
Technical institute or other post-high school training	1					
Total number of firms with entry jobs	43	5	21	29	3	7

	Contract Construction (15-17)	Transportation Public Utilities (40-49)	Wholesale Trade (50)	Retail Trade (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Administration (91-93)
Laborers:							
High school (or less)	76	29	130	284	3	43	23
High school (or less); experience	15	12	10	39		2	7
Apprenticeship or short training course	1		1				
Technical institute or other post-high school training	2			4		2	
Total number of firms with entry jobs	94	41	141	327	3	47	30

TABLE B-9

Hiring Requirements for Particular Entry Jobs for Service Workers

	Food (20)	Apparel (23)	Lumber & Wood (24)	Furniture (25)	Paper (26)	Leather (31)	Transportation Equipment (37)
Janitors:							
High school (or less)	12	4	6		12	13	3
High school (or less); experience	2	1			1	1	
Total number of firms with entry jobs	14	5	6		13	14	3
Protective Service Workers:							
High school (or less)	8	1	5	2	7	12	1
High school (or less); experience	1		7				1
Apprenticeship or short training course							
Technical institute or other post-high school training							
College degree; experience							
College; special course							
Total number of firms with entry jobs	9	1	12	2	7	12	2
Waiters, Waitresses, Counter Workers & Bartenders:							
High school (or less)	9				1		
High school (or less); experience	3		2				
Apprenticeship or short training course							
Technical institute or other post-high school training							
Mixed							
Total number of firms with entry jobs	12		2		1		

TABLE B-9 (Continued)

	Public Utilities (40-49)	Wholesale trade (50)	Retail trade (52-59)	Finance, Insurance, Real Estate (60-67)	Misc. Services (70-89)	Public Adminis-tration (91-93)
Janitors:						
High school (or less)	12	14	72	3	26	14
High school (or less); experience	1		9	1	6	7
Total number of firms with entry jobs	13	14	81	4	32	21
Protective Service Workers:						
High school (or less)	2	3	3	22	3	17
High school (or less); experience				6	2	21
Apprenticeship or short training course						27
Technical institute or other post-high school training						5
College degree; experience						1
College; special course						2
Total number of firms with entry jobs	2	3	3	28	5	73
Waiters, Waitresses, Counter Workers & Bartenders:						
High school (or less)			167		30	1
High school (or less); experience	1		119		41	4
Apprenticeship or short training course						1
Technical institute or other post-high school training			4		1	
Mixed			1			
Total number of firms with entry jobs	1		291		72	6
Bell boys, Chambermaids, & Doormen:						
High school (or less)					30	
High school (or less); experience					14	
Total number of firms with entry jobs					44	
Barbers & Beauticians:						
High school (or less)					7	
Apprenticeship or short training course					5	
Technical institute or other post-high school training					19	
Total number of firms with entry jobs					31	

91

APPENDIX C

Bibliography Relevant to Maine

Alpander, Guvenc G. "Personnel Management in Maine: A Preliminary Study of Recruitment Practices in Large Scale Private Enterprises." Unpublished monograph, Manpower Research Project, University of Maine. Orono. 1968.

Burnett, Frederick B.; and Corcoran, Thomas J.; and Shottafer, James. *Technical Education Needs and Employment Potential in Forestry-Based Occupations in Maine*. Bulletin No. 650 of the Maine Agricultural Experiment Station, University of Maine. Orono. August, 1967.

Creamer, Daniel Barnett. *Changing Location of Manufacturing Employment*. Studies in Business Economics, No. 83. National Industrial Conference Board. New York. 1963.

Dunn, Mary F. "An Economic Cost-Benefit Analysis of the Work Experience and Training Program as Shown by Its Effect in Two Counties in Maine." Unpublished monograph, Manpower Research Project, University of Maine. Orono. 1967.

Elam, R. Richard, and Finner, Stephen. *Migration of Maine's University Graduates*. Manpower Research Bulletin No. 2. Manpower Research Project, University of Maine. Orono. December, 1968.

Finner, Stephen ,and Elam, R. Richard. *Maine's Migration: What We Know and What We Need to Know*. Manpower Research Bulletin No. 1. Manpower Research Project, University of Maine. Orono. December, 1968.

Gordon, Robert Aaron, ed. *Long-term Manpower Projections*. Proceedings of a Conference Conducted by the Research Program on Unemployment and the American Economy, Washington, D. C., June 25-26, 1964. Institute of Industrial Relations, University of California. Berkeley. 1965.

Harms, Louis T., *et al. Projective Models of Employment by Industry and by Occupation for Small Areas, A Case Study*. Bureau of Economic and Business Research, School of Business Administration, Temple University. Philadelphia. 1966.

Jakubauskas, Edward B., and Palomba, Neil A. *Job Vacancies in Iowa Manufacturing Establishments as Reported for the Period March through August 1966*. Industrial Relations Center, Iowa State Manpower Development Council. Iowa State University. Ames, Iowa. April, 1967.

Little, Arthur D., Inc. *Projective Economic Studies for New England*. Cambridge, Massachusetts, 1964-1965.

———, *New England: An Economic Analysis*. A Report prepared for the New England Regional Commission. Cambridge, Massachusetts. November 1968.

Maine Department of Labor and Industry, Division of Research and Statistics. *Census of Maine Manufacturing* (annual).

Maine Department of Economic Development, *The Maine Handbook—A Statistical Abstract* (annual).

———, *Maine Buyers' Guide and Directory of Maine Manufacturers*. (annual).

Maine Employment Security Commission. *Maine Manpower*. (Monthly).

Maine Municipal Association, *Maine Townsman*. Hallowell, Maine. (annual).

Myers, John G. *Measurement of Job Vacancies: A Feasibility Study in the Rochester Area*. National Industrial Conference Board. New York. 1967.

Oregon Department of Employment. *Technological Change and Its Impact on the Oregon Labor Force*. Salem, Oregon. November, 1966.

Paradis, Henry (State of Maine Manpower Coordinator). "Trainees Enrolled up to December 31, 1968, a Catalogue of post-high school training programs in Maine." For the Governor's Manpower Advisory Committee.

Toothaker, Robert C. *Management's Attitudes and Evaluations of Government Training Programs and Government Subsidization for Industrial Training.* Manpower Research Bulletin No. 3, Manpower Research Project, University of Maine. Orono. February, 1969.

University of Maine. Bureau of Public Administration. *Government Career Development Activities 1967-1968, a Catalogue of Training Institutes in the Field of Public Administration.* Orono. 1969.

U. S. Department of Commerce Bureau of the Census. *United States Census of Population, 1960; Maine—General, Social and Economic Characteristics.* Washington, D. C., GPO, 1961. (PC(1)-21C).

———, *Maine—Detailed Characteristics.* (PC(1)-21D).

———, *County Business Patterns, Maine.*

———, *Alphabetical Index of Occupations and Industries.* (new ed.)

———, *Census of Government 1962,* vol. I, III, and VI, no. 4.

———, *Statistical Abstract of the United States 1968.*

———, *County and City Data Book, 1962, a Statistical Abstract Supplement.*

U. S. Department of Labor, Bureau of Labor Statistics. *Employment and Earnings for the United States.*

———, *Tomorrow's Manpower Needs: National Manpower Projections and a Guide to Their Use as a Tool in Developing State and Area Manpower Projections,* Draft copy. 1968.

———, *Occupational Employment Patterns for 1960 and 1975.* Bulletin No. 1599. 1968.

———, *Occupational Handbook, 1968-1969.*

———, *Manpower Report to the President* (annual).

———, Technological Trends in Major American Industries. Bulletin, No. 1474. 1966.

———, Outlook for Numerical Control of Machine Tools. Bulletin No. 1937. March 1965.

Venn, Grant. *Man, Education and Work: Post-Secondary Vocational and Technical Education.* American Conference on Education. Washington, D.C. 1964.

Wolfbein, Seymour. *Employment and Unemployment in the United States: A Study of the American Work Force.* Science Research Associates Chicago. 1964.